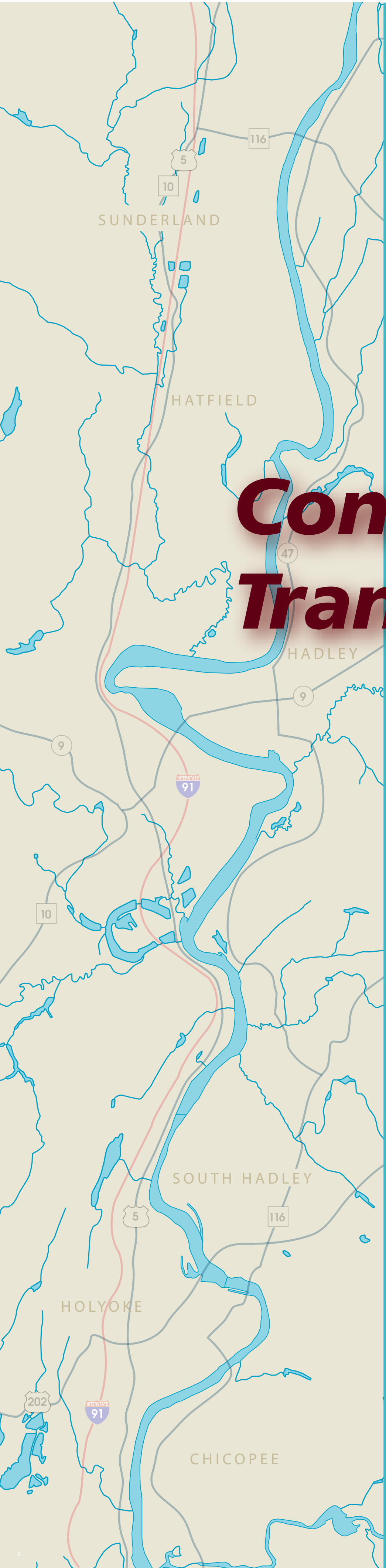

FINAL REPORT

Connecticut River Crossing Transportation Study

Prepared for:
The Massachusetts Highway Department

In cooperation with:
The Federal Highway Administration

Prepared by:
Vanasse Hangen Brustlin, Inc.
Watertown, Massachusetts

February 2004

Final Report

Connecticut River Crossing Transportation Study

Prepared for	**The Massachusetts Highway Department**
In Cooperation with	**The Federal Highway Administration**
Prepared by	***VHB*/Vanasse Hangen Brustlin, Inc.** **Watertown, Massachusetts**

February 2004

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Executive Summary

The purpose of the Connecticut River Crossing Transportation Study was to determine the need for transportation improvements, including the potential need and feasibility of providing an additional bridge over the Connecticut River, within the study area. The study area extends from Holyoke north to Sunderland (see Figure ES-1), a region divided north-to-south by the Connecticut River. A summary of the findings of this study is provided in the following pages.

Study Goal and Process

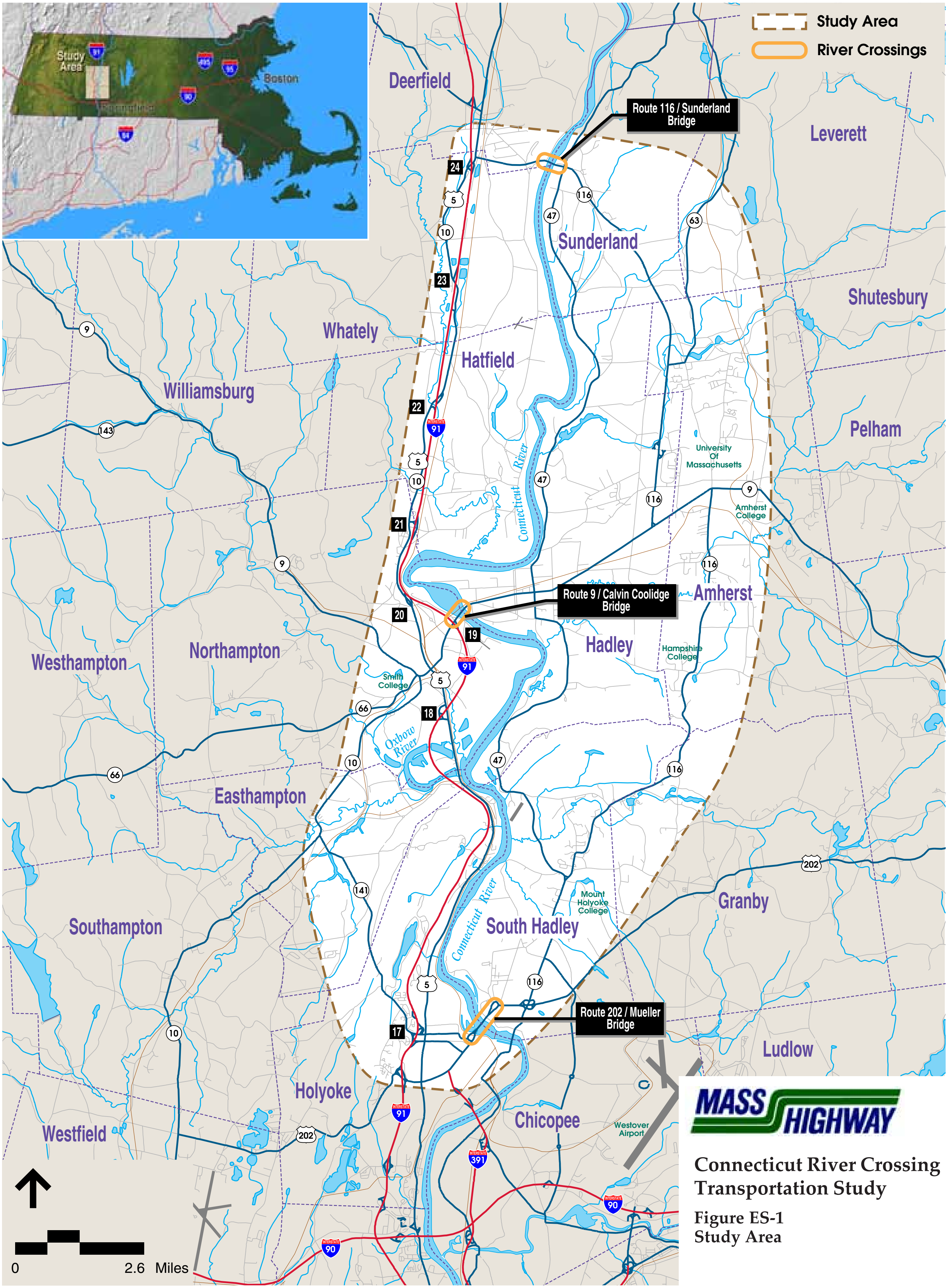
Traffic congestion in the area in recent years, particularly for east-west travel, prompted local and regional interest in exploring the potential for transportation improvement projects that would alleviate traffic congestion and improve regional mobility. MassHighway is currently addressing a high priority for the region by expanding the Coolidge Bridge over the Connecticut River from three to four lanes. (Since the closest river crossings to the north and south of the Coolidge Bridge are each approximately 10 miles away, there is a strong reliance on the Coolidge Bridge and the Route 9 corridor for local and regional access.) This study was initiated by MassHighway to develop a more comprehensive program of regional solutions to transportation congestion and safety problems in the study area.

The study was accomplished by the completion of five distinct tasks, including:

- Compilation of transportation and environmental databases;
- Assessment of existing transportation conditions;
- Forecast and assessment of future transportation conditions;
- Identification and evaluation of potential improvement alternatives; and,
- Development of a recommendation program.

Public Outreach

A major component of this project was public participation. A Study Advisory Group (SAG) was formed to provide a forum to collaboratively develop reasonable short, medium, and long-term solutions to existing and future transportation problems in the area. The Study Advisory Group was comprised of various transportation "stakeholders" in the Pioneer Valley Region who were asked to participate by MassHighway. A stakeholder is defined as a person, municipality,



Connecticut River Crossing Transportation Study

Figure ES-1
Study Area

agency, business, or group with interest in the study area. The advisory group was charged with assisting MassHighway and VHB through the duration of the study by:

- Providing direct input and advice on alternatives;
- Providing input on the potential impacts and benefits of each alternative; and
- Helping foster regional cooperation, support, and consensus for the recommendations of the study.

Throughout the study, conceptual improvements were developed with the guidance of MassHighway, and the assistance of the Study Advisory Group, the Pioneer Valley Planning Commission (PVPC) and the Franklin Regional Council of Governments (FRCOG) through eight Advisory Group meetings. Given the numerous environmentally sensitive areas along the Connecticut River and throughout the study area, a major effort involved developing a series of constraint maps to guide the development of alternatives.

Evaluation criteria were established to assist in evaluating the benefits and impacts of any improvement options. Six primary criteria were established:

- **Traffic Flow** - Vehicle delays; Level of Service (LOS); vehicle-miles traveled (VMT); vehicle-hours traveled (VHT); demand shifts; transportation demand management (TDM)/ transportation systems management (TSM) (i.e. telecommuting, signal coordination);
- **Safety** - Accident rates/high crash locations (HCLs); public safety; pedestrian and bicycle access;
- **Environmental Effects** - air quality; wetlands; hazardous materials sites; archaeological and historic sites; parks and open space; farmland; river/water quality; habitat/species; endangered species;
- **Neighborhood Effects** – Traffic increases; community character, potential dislocations;
- **Business Considerations** - Access to existing parcels and those planned for development; parking for customers; potential dislocations; and
- **Cost and Schedule** - Construction costs; cost-effectiveness; short-range feasibility; permitting and construction timeframe

In addition to the Study Advisory Group meetings, public input was solicited through two public informational meetings and outreach meetings with local officials and planning agencies. The public informational meetings were informal meetings where the study was presented and input solicited from the general public. Seven study outreach meetings were held with the PVPC, Pioneer Valley Transportation Authority (PVTA), FRCOG, UMass Transit, and the UMass Transportation Demand Management (TDM) coordinator. These meetings helped to support the assumptions used in VHB's alternatives analysis.

Existing and Future Traffic Conditions

The study examined existing and future (Year 2025) transportation conditions. Major corridors reviewed included Interstate 91, Route 9, Route 116, Route 47, Routes 5/10, and Route 202. Particular attention was paid to the three crossings of the Connecticut River in the study area at Route 116 (Sunderland/Deerfield), Route 9 (Hadley/ Northampton), and Route 202 (South Hadley/Holyoke). Of the three bridges, the Route 9 Coolidge Bridge currently carries the majority of the east-west traffic over the Connecticut River (approximately 34,900 vehicles per day (vpd)). The Route 202 Mueller Bridge carries 23,000 vpd. The Route 116 Sunderland Bridge carries the least traffic of the three bridges in the study area (approximately 17,400 vpd). The highest traffic growth is also expected on the Coolidge Bridge, where traffic is forecast to grow by 24 percent between 2002 and 2025, (just under 1 percent per year). A 17 percent increase in traffic is forecast for the Sunderland Bridge (0.7 percent annually) and a 10 percent increase is forecast on the Route 202 Mueller Bridge (0.4 percent annually) over the 23 year forecast period.

The analysis of existing traffic conditions demonstrated that the key areas of recurring congestion and safety issues in the study area are:
- Along the Route 9 corridor in Hadley;
- At the I-91/Interchange 19/Damon Road intersection in Northampton: and,
- At the Coolidge Bridge (currently under construction).

There were no apparent existing capacity constraints in the vicinity of the Sunderland Bridge, making it a more desirable alternate route. (In fact, traffic surveys completed as part of this study confirmed that some drivers are taking a more circuitous route via the Sunderland Bridge to bypass the Coolidge Bridge and Route 9 traffic).

Other key intersections with capacity constraints include:
- Route 10/Route 141 in Easthampton
- Damon Road/Bridge Road/King Street at Route 5/10 in Northampton
- I-91 southbound ramps (Exit 18) at Route 5 in Northampton
- Elm Street at Route 5/10 in Northampton
- Route 116 at Route 47 in South Hadley

The future traffic operations analyses reinforce many of the conclusions from the existing transportation assessment. The Route 9 corridor remains the area of critical concern in the future. In fact, five of the ten operationally deficient locations identified through the future conditions analysis occur along Route 9 from I-91 to Amherst Center, indicating a capacity deficiency along this corridor, the need to implement strategies that reduce demand, and the need to better manage this corridor.

Recommended Alternatives

Based on the preliminary and final screening of alternatives, along with input from the Study Advisory Group, short, medium, and long-term action plans were developed. Short-term recommendations include actions that are easily implemented within 5 years. Medium-term recommendations can be carried forward in a 5 to 10 year timeframe. Long-term recommendations are based on a 10 to 20 year horizon.

The alternatives evaluation demonstrated that the recommended improvement program can address study area congestion and mobility concerns identified under existing and future conditions without the construction of an additional bridge and connector roadway over the Connecticut River. (The study did examine four potential new bridge alignments --three locations north of the Coolidge Bridge and one location south. All four bridge locations resulted in severe impacts to wetlands, farmland, habitat, and surface/groundwater resources. Moreover, the extent of floodplain on either side of the Connecticut River would make the bridge span very long and expensive to construct. The bridges that were considered all resulted in significant environmental and social impacts that outweighed the associated traffic benefits.)

Short-Term Recommendations

Figure ES-2 shows the range of the recommended short-term actions. Short-term recommendations include actions that address existing safety and operational deficiencies to the transportation infrastructure within the study area. In general, these improvements include low-cost options that can be implemented in a short timeframe (0 to 5 years), and with less effort (i.e. signal timing and phasing changes, signal installation, and roadway restriping). The short-term recommendations are as follows:

- Begin implementation of recommended travel demand management (TDM) options including:
    - Three park and ride locations in Sunderland/Deerfield, Florence, and Damon Road, and
    - Increased north-south bus service between Deerfield/ Greenfield/Amherst
- Complete a Route 9 Corridor Preservation Plan
- Continue to invest in intelligent transportation systems (ITS) implementation program, including:
    - Implementing the short-term actions defined in PVTA's ITS Plan, and
    - Implementing the next phase of MassHighway's ITS Plan
- Implement transportation systems management (TSM) improvements at the following locations:

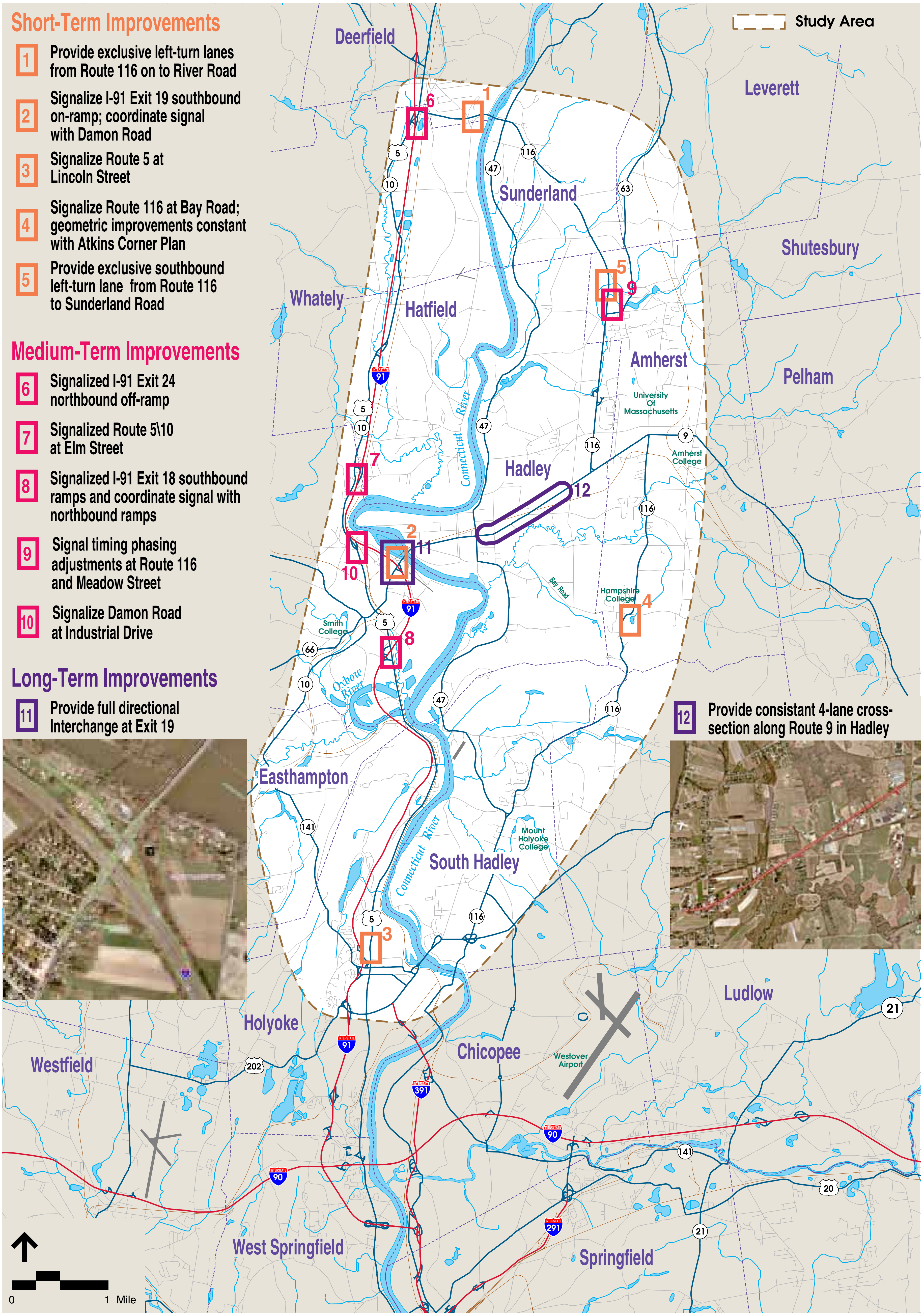
  - Route 116/River Road (Deerfield) - Upgrade the intersection to provide exclusive left and right-turn lanes onto River Road to improve safety.
  - I-91/Interchange 19 On-ramp at Route 9 (Northampton) - Install a new traffic signal at the intersection of Route 9 at I-91/Exit 19 southbound on-ramp. Traffic operations between this signal and the existing traffic signal at Route 9 and Damon Road would be coordinated. The signal would be designed so that the Route 9 westbound through movement would not be under signal control.
  - Route 5/Route 202 (Holyoke) - Install a new traffic signal at the intersection of Route 5 at Lincoln Street (Route 202) in Holyoke.
  - Route 116/Bay Road (Amherst) - Install new traffic signal at the intersection of Route 116 and Bay Road in Amherst. In addition to providing enhanced traffic operations, a signal at this location could help alleviate the safety issues caused by the skew of the intersection.
  - Routes 116/47 (South Hadley) - Install a new traffic signal at the intersection of Route 47 and Route 116 in South Hadley to improve traffic flow and better accommodate pedestrians. Plans to signalize this intersection are already under design by MassHighway.
  - Route 116 at Sunderland Road (Amherst) – Upgrade the intersection to provide an exclusive left-turn lane southbound from Route 116 on to Sunderland Road.
- Begin design and permitting process for the medium and long-term improvements.

Medium-Term Recommendations

Figure ES-2 also shows the recommended medium-term actions. Medium-term recommendations include improvements that focus on the near-term future transportation infrastructure needs, have a longer permitting and design process, and can be more costly. It is anticipated that these recommendations would be carried forward in a 5 to 10 year timeframe (assuming no additional time is necessary for right-of-way or land acquisition). The medium-term recommendations are as follows:

- Migrate the Route 9 bus service toward a hybrid bus rapid transit (BRT) system, including signal pre-emption, queue by-pass lanes, enhanced stops, and traveler information systems.

- Continue to invest in intelligent transportation systems (ITS) implementation program.



Short-Term Improvements

- 1 Provide exclusive left-turn lanes from Route 116 on to River Road
- 2 Signalize I-91 Exit 19 southbound on-ramp; coordinate signal with Damon Road
- 3 Signalize Route 5 at Lincoln Street
- 4 Signalize Route 116 at Bay Road; geometric improvements constant with Atkins Corner Plan
- 5 Provide exclusive southbound left-turn lane from Route 116 to Sunderland Road

Medium-Term Improvements

- 6 Signalized I-91 Exit 24 northbound off-ramp
- 7 Signalized Route 5\10 at Elm Street
- 8 Signalized I-91 Exit 18 southbound ramps and coordinate signal with northbound ramps
- 9 Signal timing phasing adjustments at Route 116 and Meadow Street
- 10 Signalize Damon Road at Industrial Drive

Long-Term Improvements

- 11 Provide full directional Interchange at Exit 19
- 12 Provide consistant 4-lane cross-section along Route 9 in Hadley

MASS HIGHWAY

Connecticut River Crossing
Transportation Study

Figure ES-2
Proposed Improvements

- Implement TSM improvements at the following locations:
    - I-91/Interchange 24 Off-ramp at Route 5/10 (Whately) - Install a new traffic signal at the intersection of Route 5/10 at I-91 Exit 24 northbound off-ramp.
    - Route 5/10 at Elm Street (Northampton) - Install a new traffic signal at the intersection of Route 5/10 at Elm Street.
    - I-91/Interchange 18 Southbound Ramps at Route 5/10 (Northampton) - Install a new traffic signal at the intersection of Route 5/10 at I-91 Exit 18 southbound on and off-ramps. Traffic operations at this signal would be coordinated with the adjacent existing signal at the Exit 18 northbound on and off-ramps.
    - Damon Road/Industrial Road (Northampton) - Install a new traffic signal at the intersection of Damon Road and Industrial Road to facilitate traffic along Industrial Road during peak periods.
- Interchange 19 Signal System/Ramp Improvements (Northampton) – Improve the southbound on-ramp merge maneuver by lengthening the acceleration lane on I-91, and managing the queue on the northbound off-ramp by widening the off-ramp (as shown on Figure ES-3). The traffic signals on Route 9 at Interchange 19 would continue to operate as a coordinated system. The goal of this concept was to focus on a key problem area and add as much capacity as is reasonably needed over the medium-term. In the longer-term, a more aggressive infrastructure improvement will likely be needed at Interchange 19 (see next section).

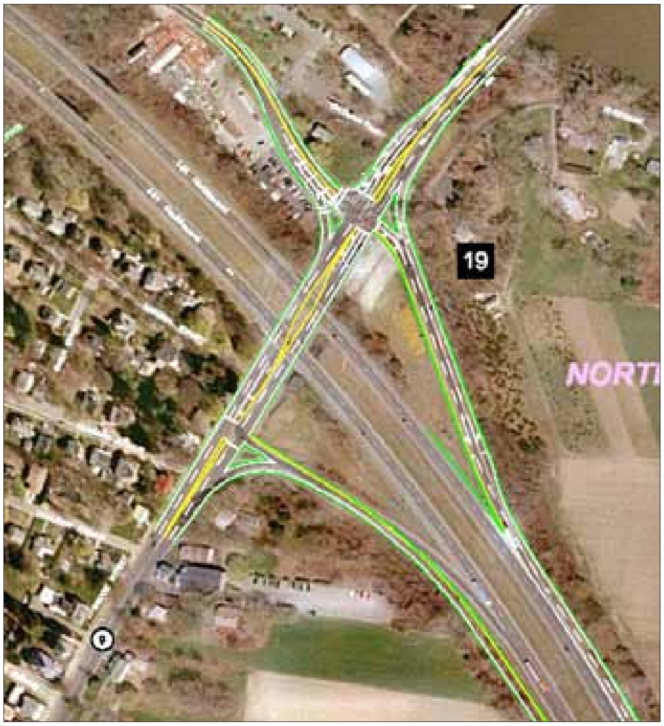


Figure ES-3
Interchange 19 Medium-Term Recommendation

- Route 116/Route 63 (Meadow Street), Amherst – Implement signal timing and phasing adjustments to improve safety conditions at this intersection.

Long-Term Recommendations

Long-term recommendations include those improvements that accommodate future roadway demands. These recommendations are capital intensive and often take longer periods of time to fund, design, and construct. It is anticipated that these projects would be carried forward in a 10 to 20 year timeframe (assuming no additional time is necessary for right-of-way and land acquisition). The long-term actions focus on I-91/ Interchange 19 and on the Route 9 corridor:

I-91/ Interchange 19 is a partial interchange, providing a northbound off-ramp and a southbound on-ramp. The recommended long-term improvement at Interchange 19 involves providing ramp connections that would make the interchange fully directional while addressing capacity deficiencies at signals on Route 9/Damon Road and Route 5/10/Damon Road. The new ramp to Damon Road would allow the existing off-ramp to be a right-turn only onto Route 9 eastbound. This would simplify the intersection of Route 9/Damon Road by removing an entering traffic stream and improving the efficiency of the traffic signal. The realignment of the southbound on-ramp would enable added storage for left-turns between intersections on Route 9. The long-term concept for Interchange 19 is depicted in Figure ES-4.

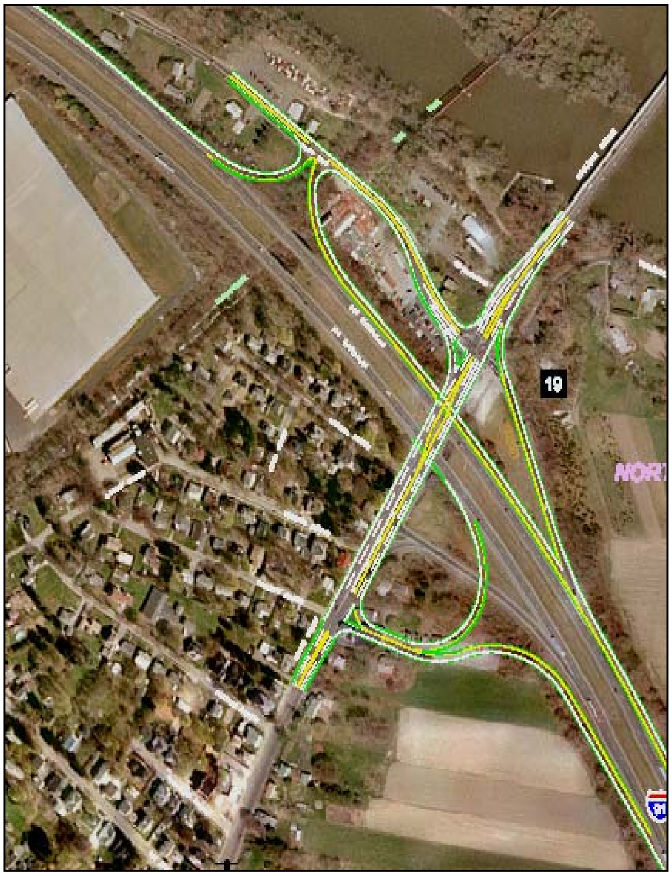


Figure ES-4
Interchange 19 Long-Term Recommendation

Once all of the planned Route 9 construction is complete, the segment of Route 9 from just east of Route 47 to North Maple Street is the only remaining segment between the Coolidge Bridge and University Avenue (at the Hadley/Amherst Town Line) that does not carry two travel lanes in each direction. The recommended long-term action on Route 9 involves widening the remaining two-lane segment to four lanes in order to eliminate the bottleneck and provide a consistent four-lane cross-section through Hadley. Figure ES-5 shows the approximate length of widening along Route 9.

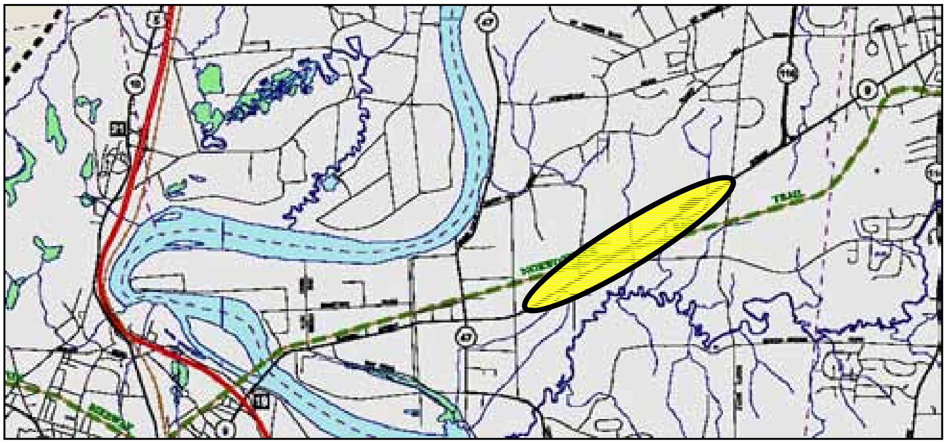


Figure ES-5
Route 9 Widening

Based on future analyses, a four-lane cross-section along Route 9 will be sufficient to accommodate the projected 2025 traffic volume along the corridor. The forecasts do not account for any significant growth at area Colleges and Universities or for areas of Route 9 that could be rezoned to permit more dense development. The operational analysis does assume that corridor improvements include better access management and land use control along the corridor. A corridor preservation plan that links land use and transportation decisions is vital to future mobility of this regional corridor.

Implementation Costs

Conceptual construction costs to implement the identified improvement program are summarized in Table ES-1 for the short, medium, and long-term actions.

Table ES-1
Recommended Improvement Costs[1]

Short-Term Improvements	**Estimated Construction Cost[2]**
• TDM Options	Variable
• ITS Options	Variable
• Route 116/River Road Improvements	$25,000
• Signalize I-91 Interchange 19 On-Ramp at Route 9	$150,000
• Signalize Route 5 at Route 202	$150,000
• Signalize Route 116/Bay Road	$175,000
• Signalize Route 116/47	$175,000
• Route 116 intersection improvements at Sunderland Road	$5,000
• Route 9 Corridor Preservation Study	$100,000
Medium-Term Improvements	
• TDM Options	Variable
• ITS Options	Variable
• Signalize I-91 Interchange 24 Off-Ramp at Route 5/10	$150,000
• Signalize Route 5/10 at Elm Street	$150,000
• Signalize I-91 Interchange 18 southbound ramps at Route 5/10	$150,000
• Signalize Damon Road at Industrial Road	$150,000
• Interchange 19 Signal System/Ramp Improvements	$3,500,000
• Route 116 intersection improvements at Meadow Street	$5,000
Long-Term Improvements	
• I-91 Interchange 19 Improvements (fully directional)	$8,400,000
• Route 9 Widening	$4,200,000

[1] Costs are exclusive of permitting and design fees and right-of-way or land acquisition fees

[2] MassHighway 2002 unit prices were used to develop cost estimates

1.0 Introduction

The Massachusetts Highway Department (MassHighway) has recognized the need to identify and evaluate short, medium, and long-term transportation improvements in the Pioneer Valley Region of Western Massachusetts. This study, the Connecticut River Crossing Transportation Study, was initiated by MassHighway to provide a forum for municipalities, business leaders, and environmental advocacy groups to collaboratively develop reasonable solutions to transportation problems in the area.

The area of concern for this study extends from Holyoke north to Sunderland, a region divided north-to-south by the Connecticut River. In recent years, traffic congestion in the area, particularly for east-west travel, has prompted local and regional interest in exploring the potential for a transportation improvement project or projects that would alleviate traffic congestion and improve regional mobility.

This study identifies existing and projected traffic and safety problems in the study area. Throughout the study, alternative solutions have been developed through the guidance of MassHighway, and the assistance of the Study Advisory Group, the Pioneer Valley Planning Commission (PVPC) and the Franklin Regional Council of Governments (FRCOG). Given the many environmental constraints throughout the study area, a major effort involved developing a series of constraint maps that guided the development and assessment of alternatives. The alternatives were evaluated for effectiveness, and assessed for environmental and community impacts. The culmination of this study is a recommended plan of action for future transportation improvements in the area.

This report is a major product of the study which documents all phases of the work efforts completed, including the input from the Study Advisory Group and the public. This report is comprised of the following chapters:

- Chapter 1 – Introduction
- Chapter 2 – Existing Transportation Conditions
- Chapter 3 – Existing Environmental Conditions
- Chapter 4 – Future Transportation Conditions
- Chapter 5 – Alternatives Considered
- Chapter 6 – Evaluation of Alternatives
- Chapter 7 – Recommended Improvement Plan

1.1 Study Purpose

The study area for this assessment is depicted in Figure 1-1. The area generally extends from Holyoke to Sunderland and includes the communities on both sides of the Connecticut River. Growth in the study area and growing traffic congestion around the Route 9 Coolidge Bridge between Northampton and Hadley has prompted MassHighway to study transportation improvements that would efficiently accommodate desired travel patterns.

At the time of this study, MassHighway was in the process of reconstructing and expanding the Coolidge Bridge from 3 lanes to 4 lanes. Because the closest river crossings to the north and south of the Coolidge Bridge are each approximately ten miles away, there is a strong reliance on the Coolidge Bridge and the transportation infrastructure that provides access to the bridge.

The purpose of this transportation study was to determine the need for transportation improvements, including the potential need and feasibility of providing an additional bridge crossing over the Connecticut River within the study area. The study identified a wide range of solutions and provided a recommended plan for future actions. Any new bridge options must consider the associated infrastructure improvements needed to make logical connections to the existing roadway system. Specifically, connections to the regional highway infrastructure on the west side of the Connecticut River (I-91 and Route 5) must be considered.

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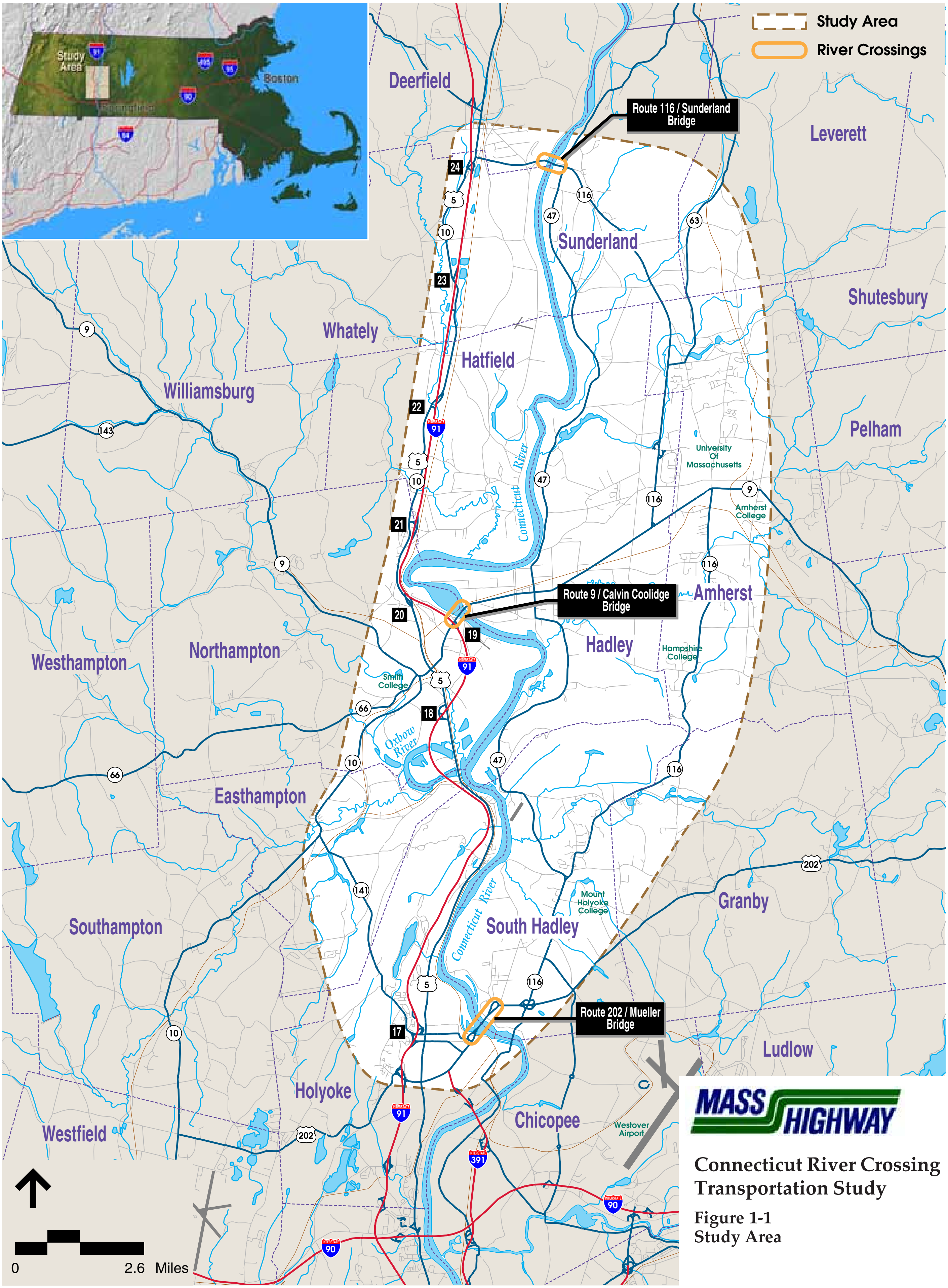


Connecticut River Crossing Transportation Study

Figure 1-1
Study Area

1.2 Evaluation Criteria

Evaluation criteria were developed to help measure the effectiveness of potential alternatives. These criteria were determined at the outset of the study by the Study Advisory Group. The criteria were used to identify alternatives that meet the study goals and to help guide recommendations.

The evaluation criteria were:

- **Traffic Flow -** Vehicle delays; Level of Service (LOS); vehicle-miles traveled (VMT); vehicle-hours traveled (VHT); demand shifts; transportation demand management (TDM)/ transportation systems management (TSM) (i.e. telecommuting, signal coordination);
- **Safety** - Accident rates/high crash locations (HCLs); public safety; pedestrian and bicycle access;
- **Environmental Effects** - air quality; wetlands; hazardous materials sites; archaeological and historic sites; parks and open space; farmland; river/water quality; habitat/species; endangered species;
- **Neighborhood Effects** – Traffic increases; community character, potential dislocations;
- **Business Considerations** - Access to existing parcels and those planned for development; parking for customers; potential dislocations; and
- **Cost and Schedule -** Construction costs; cost-effectiveness; short-range feasibility; permitting and construction timeframe

1.3 Study Process

A comprehensive and thorough transportation planning study involves a well-defined structure or process for execution of the study. The tasks for this study were as follows:

- Task 1.0 Study Organization/Project Initiation/Public Outreach
- Task 2.0 Existing Conditions and Problem Identification
- Task 3.0 Alternatives Development
- Task 4.0 Alternatives Analysis
- Task 5.0 Recommendations
- Task 6.0 Draft and Final Reports

Part of the initial stages of this project involved the establishment of a Study Advisory Group. The purpose of the Study Advisory Group was to advise project staff throughout the study, review all technical documents, and provide direct input on alternatives. Most importantly, the group was intended to help foster regional cooperation, support, and consensus for the recommendations of the study. The Study Advisory Group served as a forum for discussion of key issues such as existing transportation conditions and problems in the study area, environmental constraints, and feasibility of the various improvement alternatives.

The group provided input and advice on the study, suggest alternatives to be considered, and provided input on the potential impacts and benefits of alternatives.

1.4 Study Outreach

A major component of this study involved outreach with the Study Advisory Group for technical guidance. Aside from Study Advisory Group meetings, public input was solicited through public informational meetings and outreach meetings with local officials and planning agencies. Table 1-1 lists the Study Advisory Group, agency, and public meetings that were held over the duration of this study.

Table 1-1
Study Outreach Program

MEETING	DATE	TOPIC
Study Advisory Group #1	May 14, 2002	Study Goals and Objectives; Study Area Study Advisory Group Role
Study Advisory Group #2	September 12, 2002	Existing Transportation/Environmental Conditions
Study Advisory Group #3	October 17, 2002	Future 2025 Transportation Conditions Discussion of Preliminary Alternatives
PVPC Outreach Meeting	October 31, 2002	Discuss Regional Travel Demand Model Issues Review Trends and Model Inputs
Study Advisory Group #4	December 10, 2002	Review of Changes to Regional Travel Demand Model for 2025 Baseline Analysis Discussion of Preliminary Alternatives
MassHighway District 2 Outreach Meeting	February 6, 2003	Review preliminary list of improvement alternatives Discuss inclusion of additional alternatives
PVPC Outreach Meeting	February 6, 2003	Review preliminary list of improvement alternatives Discuss inclusion of additional alternatives
FRCOG Outreach Meeting	February 6, 2003	Review preliminary list of improvement alternatives Discuss inclusion of additional alternatives
PVTA Outreach Meeting	March 5 2003	Review preliminary list of improvement alternatives Discuss inclusion of additional alternatives
Study Advisory Group #5	April 1, 2003	Review of Future 2025 Transportation Conditions Identification of Alternatives through working groups
Study Advisory Group #6	May 13, 2003	Review of Infrastructure/Bridge/ TSM Alternatives – Preliminary Screening; Discussion of Alternatives and Effects
Study Advisory Group #7	July 15, 2003	Review of TDM Alternatives – Preliminary Screening Update of Infrastructure Options Discussion of Alternatives and Effects
Transit Outreach Meeting	September 9, 2003	Review transit mode analysis assumptions with PVTA, PVPC, and UMass Transit
TDM Outreach Meeting	September 16, 2003	Review UMass TDM program with UMass TDM/Route 9 TMA Coordinator
ITS Outreach Meeting	September 16, 2003	Review RTIC program and future plans
Study Advisory Group #8	October 21, 2003	Review of TDM Alternatives – Final Screening Discussion of Alternatives and Effects Presentation of draft Recommendations
Public Informational Meeting	December 9, 2003	Project overview; Presentation of preliminary recommendations

2.0 Existing Transportation Conditions

This chapter describes the existing transportation conditions within the study area. Sections of this chapter present demographics, traffic volumes and operations, travel times, transit services, safety and geometrics, desired travel patterns, and a summary of the transportation deficiencies/needs. For the safety and capacity analyses, the following key intersections were evaluated:

Signalized Intersections

- Route 10 at Route 141 (Easthampton)
- Route 5 at Hamden Street/Route 141 (Holyoke)
- Route 5 at Dwight Street/Route 141 (Holyoke)
- I-91 Northbound Ramps (Exit 18) at Route 5/10 (Northampton)
- Route 9 at Damon Road/I-91 Northbound Off-Ramp (Northampton)
- Damon Road at North King Street (Northampton)
- Route 9 at Bay Road (Hadley)
- Route 9 at Route 47 (Hadley)
- Route 9 at Route 116 (Hadley)
- Route 9 at Route 116 (Amherst)
- Route 116 at Route 47 (Sunderland)
- Route 116 at Sugarloaf Street (Sunderland)
- Route 116 at Route 5/10 (Whately)

Unsignalized Intersections

- I-91 Southbound Ramps (Exit 18) at Route 5 (Northampton)
- I-91 Southbound On-Ramp (Exit 19) at Route 9 (Northampton)
- Damon Road at Industrial Drive (Northampton)
- I-91 Ramps (Exit 21) at Route 5/10 (Northampton)
- Elm Street at Route 5/10 (Northampton)
- I-91 Ramps (Exit 22) at Route 5/10 (Hatfield)
- I-91 Ramps (Exit 24) at Route 5/10 (Whately)
- Route 202(Lincoln Street) at Route 5 (Holyoke)
- Route 202 (Mueller Bridge) U-Turn (Holyoke)

- Route 116 at Route 202 (South Hadley)
- Route 116 at Route 47 (South Hadley)
- Route 116 at Bay Road (Amherst)

2.1 Study Area Demographics

This section provides an overview of the transportation-related demographics for the study area communities. These include population, journey-to-work statistics, and employment. This demographic data will help identify activity nodes in the study area.

2.1.1 Population and Journey –to–Work

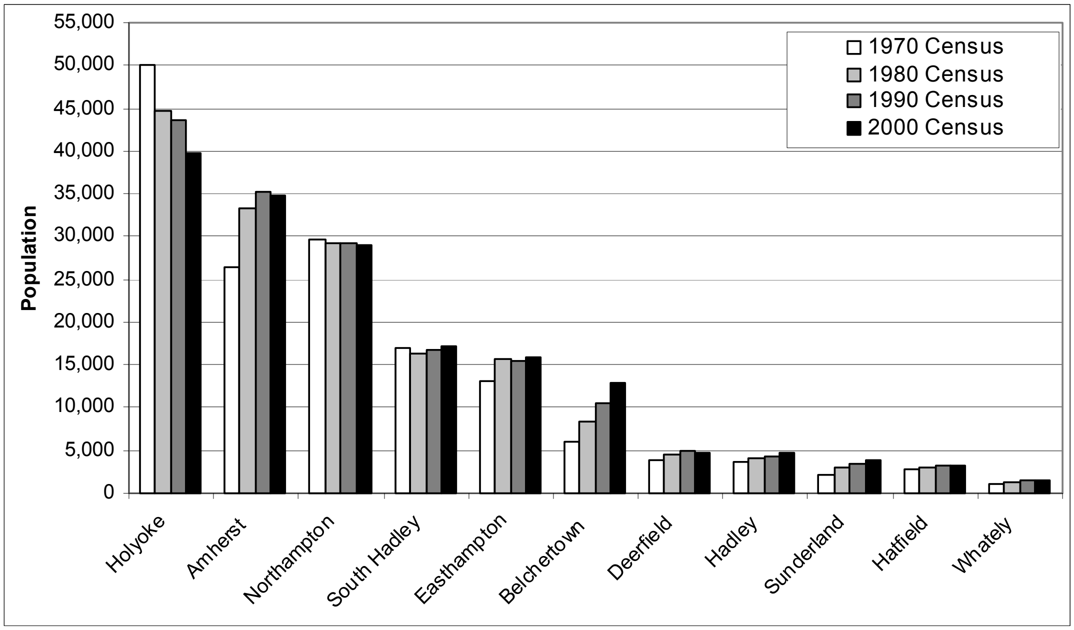
Census population data for the study area communities were obtained for 1970, 1980, 1990 and 2000. Figure 2-1 and Table 2-1 summarize the recorded population for the communities in the study area and the change from 1970 to 2000. Table 2-1 also summarizes journey-to-work data for these communities from the 1990 census.

From the census data, Holyoke and Amherst are the two most populated communities in the study area. The recorded year 2000 population in Holyoke was approximately 39,800 persons and the year 2000 population in Amherst was 34,900 persons. Northampton, South Hadley, and Easthampton have population estimates of approximately 29,000, 17,200, and 16,000 persons for 2000, respectively. Belchertown (13,000), Deerfield (4,800), Hadley (4,800), Sunderland (3,800), Hatfield (3,300), and Whately (1,600) have the lowest populations of the communities in the study area.

Comparing the census data over time reveals several key trends. Holyoke is the only study area community experiencing a decline in population. From 1970 to 1990, the population in Holyoke had declined by approximately 10,000 persons, or 20 percent. Loss of population can be attributable to many factors including less job opportunities, inflated housing costs, or safety/security concerns. Amherst and Belchertown were the study area communities that experienced the highest rate of growth. The aggregate population data for the study area (Figure 2-2) shows steady population growth from 1970 to 1990 followed by a low-growth period from 1990 to 2000.

Table 2-1 summarizes journey-to-work data from the 1990 census for the study area communities (the 2000 census data are not yet available). The trip data is expressed in person trips, meaning that they include vehicle, transit, and walk/bike modes. For example, over the course of a typical weekday, there are 16,400 persons in Amherst who commute to work and 21,300 persons destined to Amherst for work. In general, the daily trip origin and destination data rank similarly with the population data, where more developed and populated areas such as Holyoke, Amherst, and Northampton have the highest number of trip origins and trip destinations.

Figure 2-1
Study Area Population



Source: US Census Data
Note: The Town of Deerfield is considering an appeal to the 2000 Census Data

Figure 2-2
Study Area Population

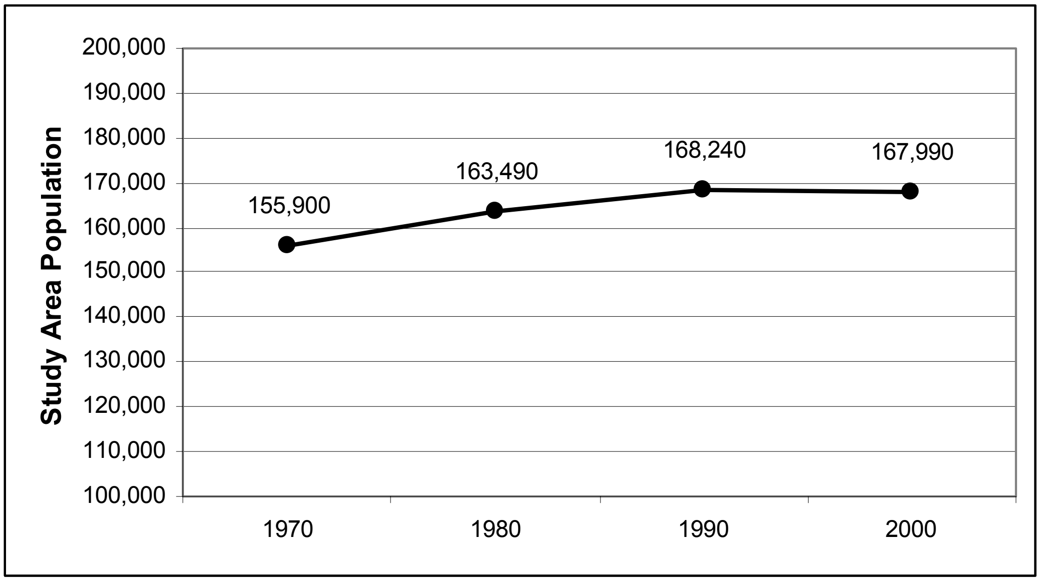


Table 2-1
Study Area Demographics/Work Trip Generation

Municipality	1990 Population	2000 Population	% Change 1990 to 2000	1990 Journey To Work Daily Trip Origins	1990 Journey To Work Daily Trip Destinations
Holyoke	43,700	39,850	-9 %	15,700	23,100
Amherst	35,200	34,900	-1 %	16,400	21,300
Northampton	29,300	29,000	-1 %	14,950	19,200
South Hadley	16,700	17,200	3 %	8,550	5,900
Easthampton	15,500	16,000	3 %	8,000	4,300
Deerfield[1]	5,000	4,750	-5 %	2,700	3,250
Hadley	4,200	4,800	13 %	2,150	2,550
Sunderland	3,400	3,800	11 %	1,950	950
Hatfield	3,200	3,250	2 %	1,550	730
Whately	1,400	1,600	14 %	750	500
TOTAL STUDY AREA	**157,600**	**155,150**	**-2%**	**72,700**	**81,780**

Sources: US Census Data
1990 Central Transportation Planning Package US Census journey-to-work data.

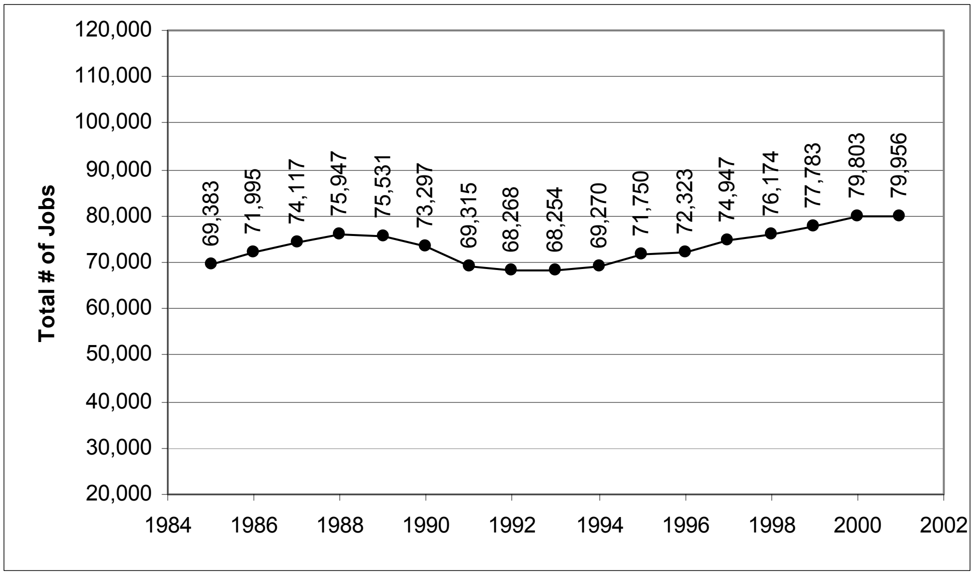
1. The Town of Deerfield is considering an appeal to the 2000 Census population estimate.

2.1.2 Employment

Employment data for the Pioneer Valley and Franklin County regions were obtained from the Massachusetts Department of Employment and Training (DET), the Pioneer Valley Planning Commission (PVPC), and the Franklin Regional Council of Governments (FRGOC) to help define the major activity nodes within, and surrounding the study area. These activity nodes influence the transportation network because they serve as trip productions and attractions for work-related trips.

Figure 2-3 depicts the DET employment data for the study area communities from 1985 to 2001. There are currently approximately 80,000 jobs in the study area. The DET data show a decline in jobs between 1988 and 1993. From 1985 to 1988, and from 1993 to 2001, the number of jobs steadily increased . From 1985 to 2001, the growth trend was approximately 0.57 percent additional jobs per year.

Figure 2-3
Employment Trend for the Study Area



Source: Department of Employment and Training Data from 1985 to 2001

Table 2-2 summarizes the major employers in the Pioneer Valley and Franklin County regions, ranked by the total number of employees.

Table 2-2
Study Area Major Employers

Municipality	Employer	Total Employees
Amherst	University of Massachusetts	4,700
Northampton	Smith College	1,130
Deerfield/Whately	Yankee Candle	1,040
South Hadley	Mount Holyoke College	760
Northampton	Cooley Dickinson Hospital	740
Northampton	Veterans Administration Medical Center	660
Easthampton	Tubed Products Inc	630
Holyoke	City of Holyoke	610
Amherst	Amherst College	550
Holyoke	Sisters of Providence Health Systems	490
Holyoke	Holyoke Hospital	460
South Deerfield	Greenfield Industries	410
Holyoke	American Pad & Paper Company of Delaware	400
Holyoke	Holyoke Community College	340
Deerfield	Deerfield Academy	330

Sources: 1997 Major Employers Inventory, September 1998.
The Greater Franklin County Region Comprehensive Economic Development Strategy, June 2000.

The University of Massachusetts at Amherst (UMass) is the largest employer in the study area, with approximately 4,700 employees. Massachusetts Mutual Life Insurance and Baystate Medical Center, both located south of the study area in Springfield, employ 3,400 and 3,000 persons, respectively. Other employers with over 1,000 employees are Milton Bradley of East Longmeadow (2,200 employees), the City of Springfield (2,160 employees), Smith College in Northampton (1,130 employees), and Yankee Candle in Deerfield and Whately (1,040 employees).

2.1.3 Student Population

The undergraduate enrollment for the 5 major colleges and universities in the study area was obtained from each institution to demonstrate the academic influence in the region. Table 2-3 presents the data for UMass, Smith College, Mount Holyoke College, Amherst College, and Hampshire College.

Table 2-3
Study Area Student Population

School	2002/2003 Total Enrollment[1]
University of Massachusetts	18,400
Smith College	2,600
Mount Holyoke College	2,000
Amherst College	1,600
Hampshire College	1,200

1 Total undergraduate enrollment as identified in university/college admission websites.

Throughout the study area, there are a total of 25,800 enrolled undergraduate students. UMass has the largest population, with 18,400 enrolled undergraduates or approximately 71 percent of the student population.

2.1.4 Summary

The population and journey-to-work data for the study area communities revealed the communities in the study area that are key activity centers. Holyoke, Amherst, Northampton, South Hadley, and Easthampton are the top activity centers. The other communities in the study area have a much lower population and lower trip production/attraction. From 1990 to 2000, the communities of Whately, Hadley, and Sunderland saw the greatest percent increase in population. The highest loss of population (on a percentage basis) from 1990 to 2000 occurred in Holyoke and Deerfield.

The top employer for the study area is the University of Massachusetts in Amherst with 4,700 employees. The other top employers in the study area include Smith College in Northampton (1,130 employees) and Yankee Candle in Deerfield and Whately (1,040 employees).

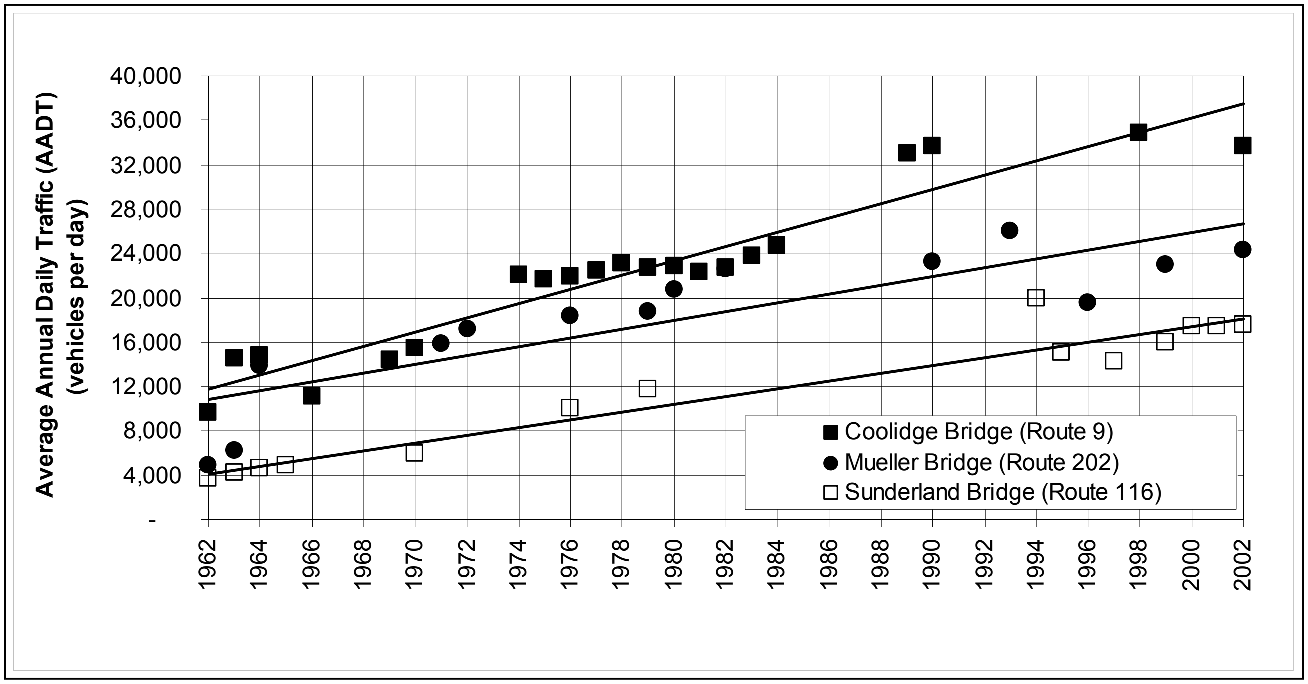
2.2 Traffic Volumes

This section quantifies the traffic volumes on the three bridge crossings and on other key roadways in the study area. Annual average traffic data, along with typical weekly and daily data are presented to compare traffic trends and characteristics by year, by day-of-week, and by hour of the day. The traffic volumes presented in this section are comprised of all types of trip purposes (work-related, shopping, recreational, etc). Work-related trips typically comprise approximately 20 to 25 percent of the total trips for a typical weekday.

2.2.1 Average Annual Daily Traffic

Traffic data on the three bridge crossings in the study area were obtained and reviewed to quantify the magnitude of traffic on the bridges and to show trends that have occurred over the years. Average annual daily traffic data (AADT) for the crossings were obtained from MassHighway and the FRCOG. AADT is expressed in terms of vehicles per day, and is adjusted by MassHighway for month-to-month seasonal fluctuations so that the data is representative of an annual average condition and not one particular month. For example, reporting traffic data during the summer would not include school-related traffic and doing so would underestimate traffic conditions. Comparing historical AADTs at one location helps determine trends without the influence of a seasonal bias. Comparing AADTs at several locations helps provide an “apples-to-apples” comparison of traffic volumes. Figure 2-4 depicts the AADT for the three bridge crossings in the study area.

Figure 2-4
Historical Bridge Crossing Volumes

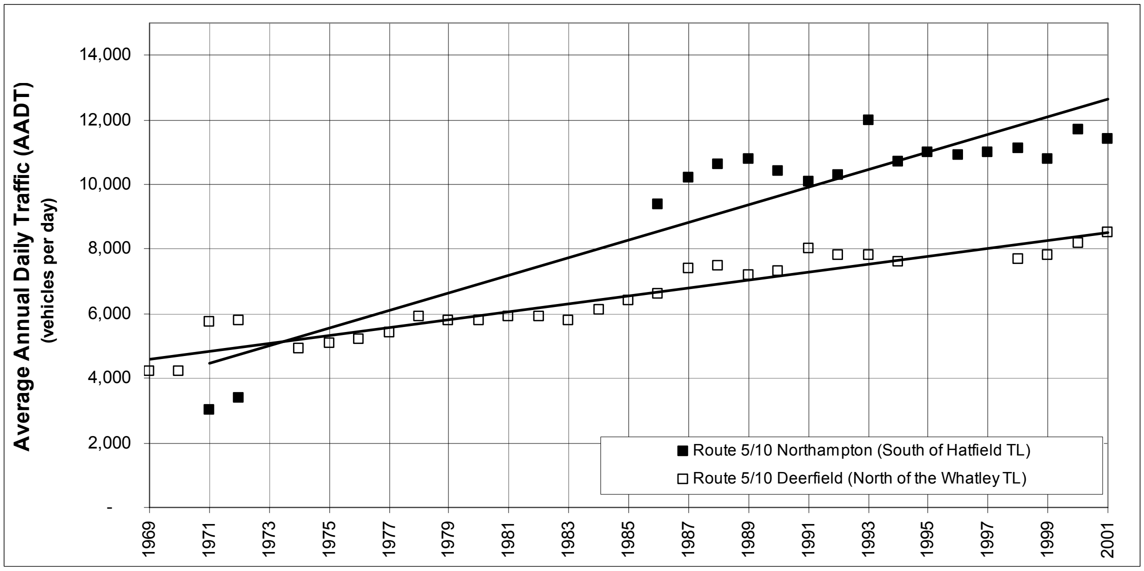


Sources: Massachusetts Highway Department; Franklin Regional Council of Governments

As indicated in Figure 2-4, the Coolidge Bridge carries the majority of the east-west traffic over the Connecticut River, approximately 35,000 vpd. The Sunderland Bridge carries the least traffic of the three bridges in the study area, approximately 17,000 vpd. Historical trends of traffic increases from 1962 are similar for all three bridges where traffic has been increasing by about 2 to 3 percent per year. However, looking at the bridge data from 1990 on reveals little to no growth.

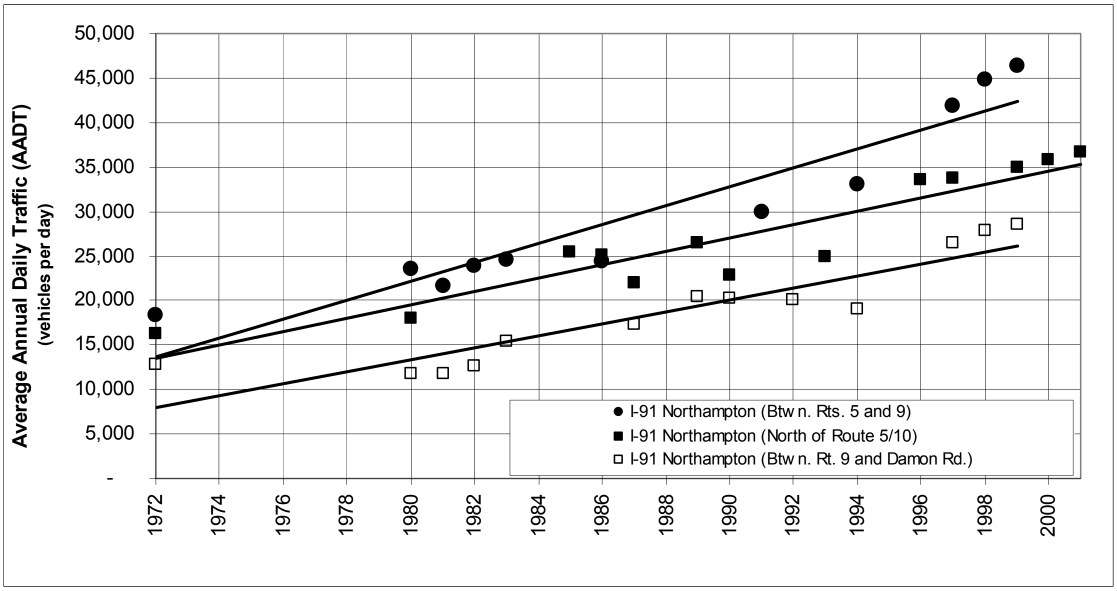
For comparison purposes, traffic volumes on other key roadways in the study area have been summarized on Figures 2-5 through 2-7. As indicated, the Coolidge Bridge carries approximately the same daily volume as I-91 at the Whately/Hatfield town line. Volumes on this section of I-91 have increased from 1992 to 2001. Traffic volumes on Route 9 and Route 116 have decreased slightly between 1997 and 2001. Volumes on Route 5/10 and Route 47 have not significantly fluctuated from 1992 to 2001.

Figure 2-5
Historical Traffic Volumes on Route 5/10



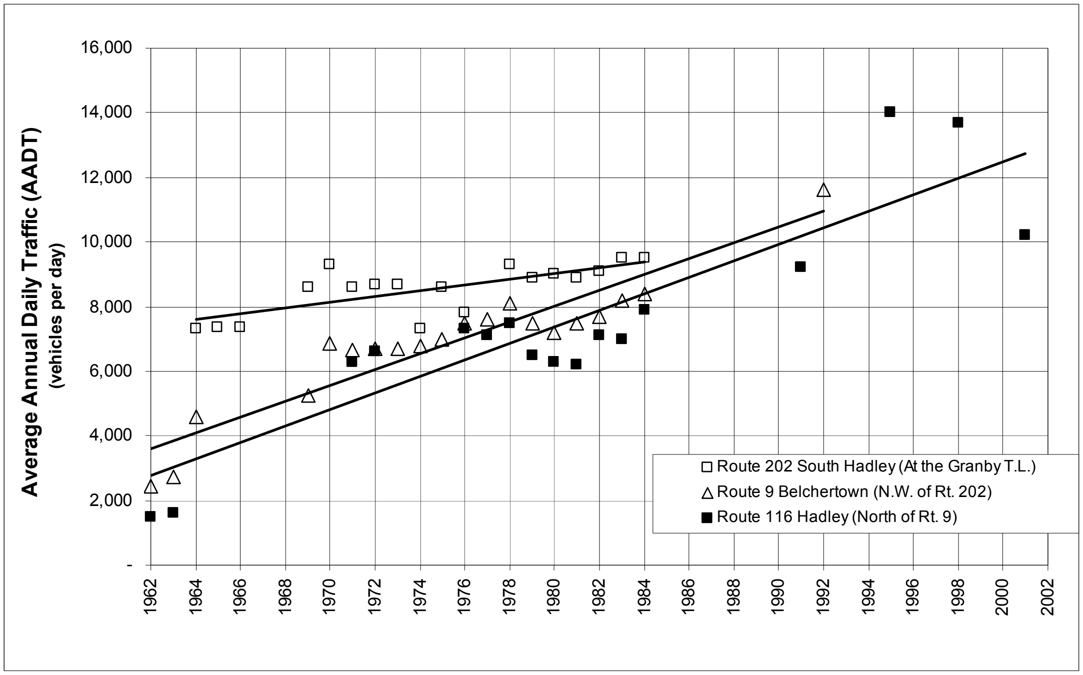
Source: Massachusetts Highway Department

Figure 2-6
Historical Traffic Volumes on I-91



Source: Massachusetts Highway Department

Figure 2-7
Historical Traffic Volumes on Route 202, Route 9, Route 116

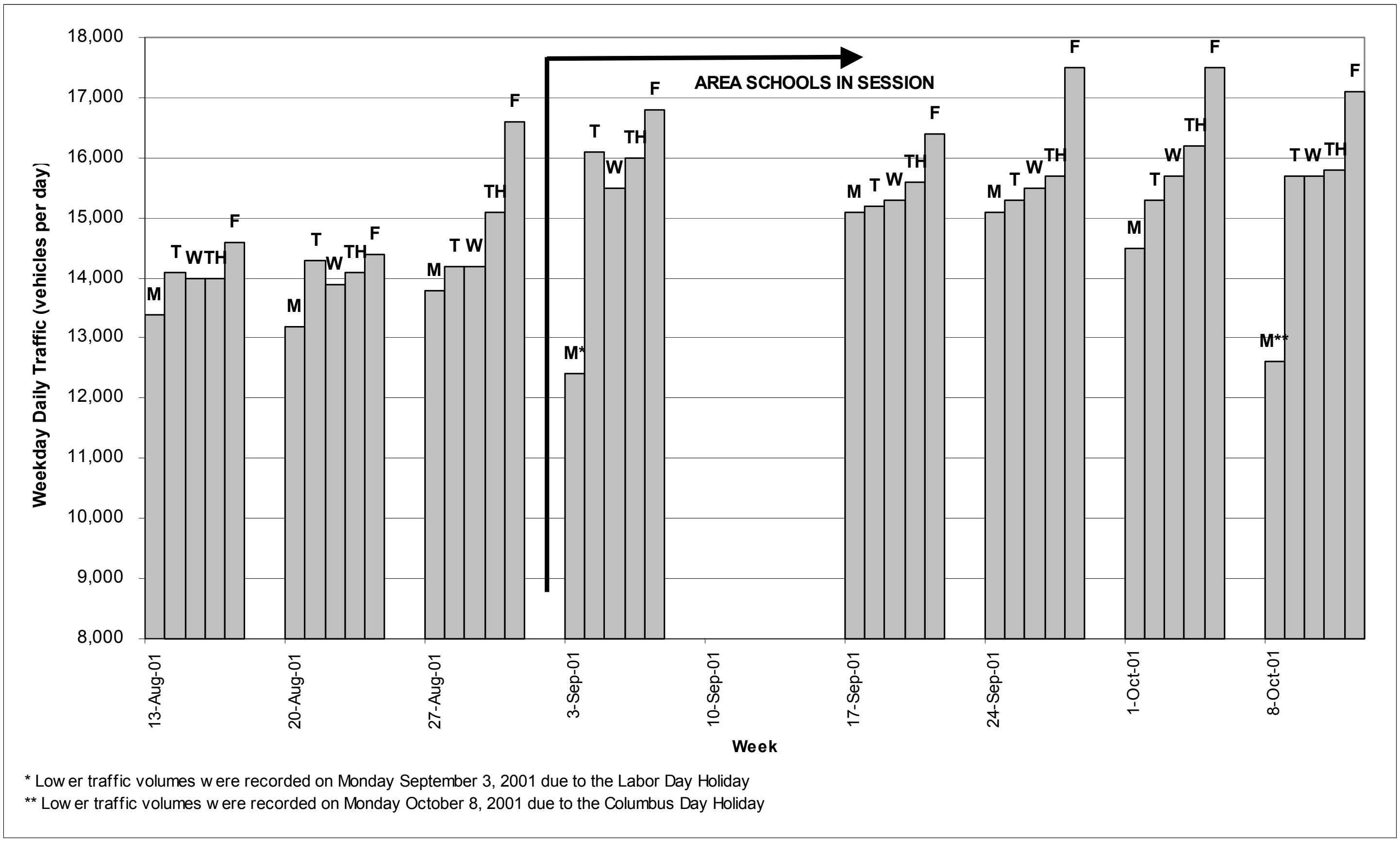


Source: Massachusetts Highway Department

2.2.2 Day-of-Week Fluctuations in Traffic

AADT provides an indication of the overall magnitude of traffic carried on a facility for a typical day during a typical month of the year. AADT does not, however, provide insight into how traffic on a particular roadway fluctuates over the course of a typical week (i.e. Monday through Friday fluctuations). Figure 2-8 depicts the traffic fluctuations on Route 116 at the Amherst/Sunderland town line for several weekday periods. For comparison, data is provided for periods occurring before and while schools were in session. Data are not provided for the week of September 10, 2002 due to the atypical traffic patterns occurring that week (as the colleges begin the fall session).

Figure 2-8
Day-of-Week Fluctuations in Traffic - Route 116 at Amherst/Sunderland Town Line



* Lower traffic volumes were recorded on Monday September 3, 2001 due to the Labor Day Holiday
** Lower traffic volumes were recorded on Monday October 8, 2001 due to the Columbus Day Holiday

Source: FRCOG Data

Route 116 at the Amherst/Sunderland town line carries between 14,000 vehicles per day (vpd) and 17,000 vpd, depending on the day of the week and whether school is in session . The weekday data demonstrate that traffic on Route 116 is typically higher on Thursdays and Fridays. Friday is clearly the day of the week with the highest traffic volumes. When the area schools are not in session (before September), traffic is somewhat lower than when schools are in session.

2.2.3 Hourly Fluctuations in Traffic

Looking at how traffic fluctuates over a typical day provides insight into when peak periods occur and the intensity of traffic occurring during the peak period. Automated traffic recorder (ATR) data from the three bridges in the study area were obtained for a typical day of the week to demonstrate hourly fluctuations. Figures 2-9 through 2-11 depict these ATR data from 7:00 AM to 7:00 PM.

Figure 2-9
Hourly Fluctuations in Traffic on Study Area Bridges – Sunderland Bridge

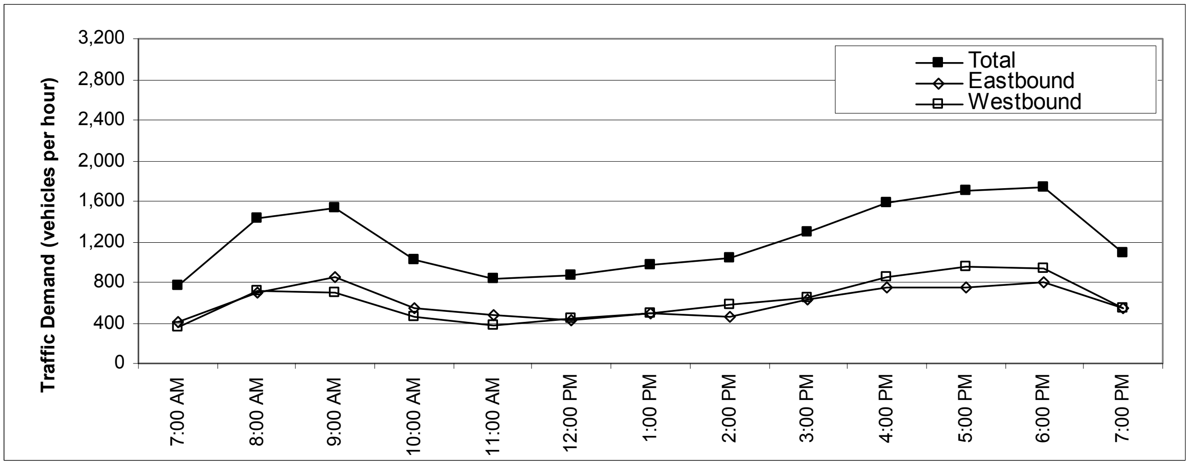


Figure 2-10
Hourly Fluctuations in Traffic on Study Area Bridges – Mueller Bridge

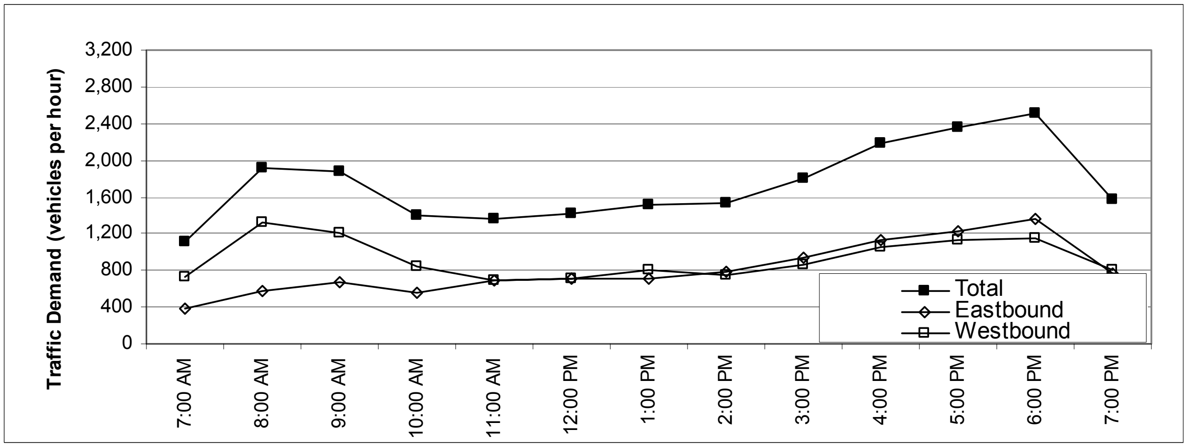
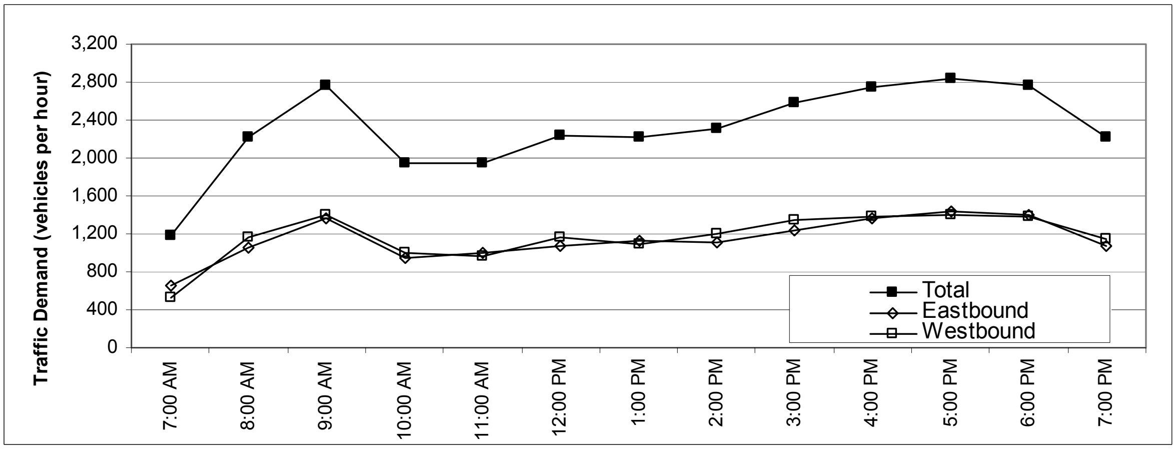


Figure 2-11
Hourly Fluctuations in Traffic on Study Area Bridges – Coolidge Bridge



The three bridges in the study area exhibit similar traffic patterns on a typical weekday. For all three crossings, there is a distinct morning peak period between 7:00 AM and 9:00 AM. Traffic drops after 9:00 AM until midday. After 2:00 PM, volumes steadily increase. The evening peak period occurs between 4:00 PM and 6:00 PM and is not as pronounced as the morning peak.

The Coolidge Bridge carries the most traffic of the three bridges, approximately 2,800 vehicles per hour (vph) in the morning and evening peak periods. The Mueller Bridge carries approximately 2,000 vph in the morning peak and 2,500 vph in the evening peak. The Sunderland Bridge handles approximately 1,500 vph in the morning peak and 1,700 in the evening peak – approximately half of the traffic on the Coolidge Bridge. Evening peak period traffic is typically higher than morning peak hour traffic because non-work related trips usually occur in the afternoon or evening.

2.2.4 Summary

Of the three bridges in the study area, the Coolidge Bridge carries the majority of the east-west traffic over the Connecticut River, approximately 35,000 vehicles per day (vpd). The Sunderland Bridge carries the least traffic of the three bridges in the study area, approximately 17,400 vpd. The three bridges exhibit similar traffic patterns on a typical weekday. There is a distinct morning peak period between 7:00 AM and 9:00 AM, traffic drops after 9:00 AM until midday. Traffic gradually increases to an evening peak period occurs between 4:00 PM and 6:00 PM.

Weekday data show that traffic in the area is typically higher on Thursdays and Fridays than other days of the week. Friday is clearly the day of the week with the highest traffic volumes. When the area schools are not in session (before September), traffic in the area is somewhat lower than when schools are in session.

2.3 Travel Times

To help assess existing operating conditions and identify areas of recurring traffic congestion, travel time data were collected along key segments of highways in the study area. Travel time observations were made during the morning and evening peak periods and during non-peak periods (midday). Several observations were taken over each period on a typical day with no crashes, breakdowns, adverse weather conditions, or other special events that would result in atypical traffic conditions.

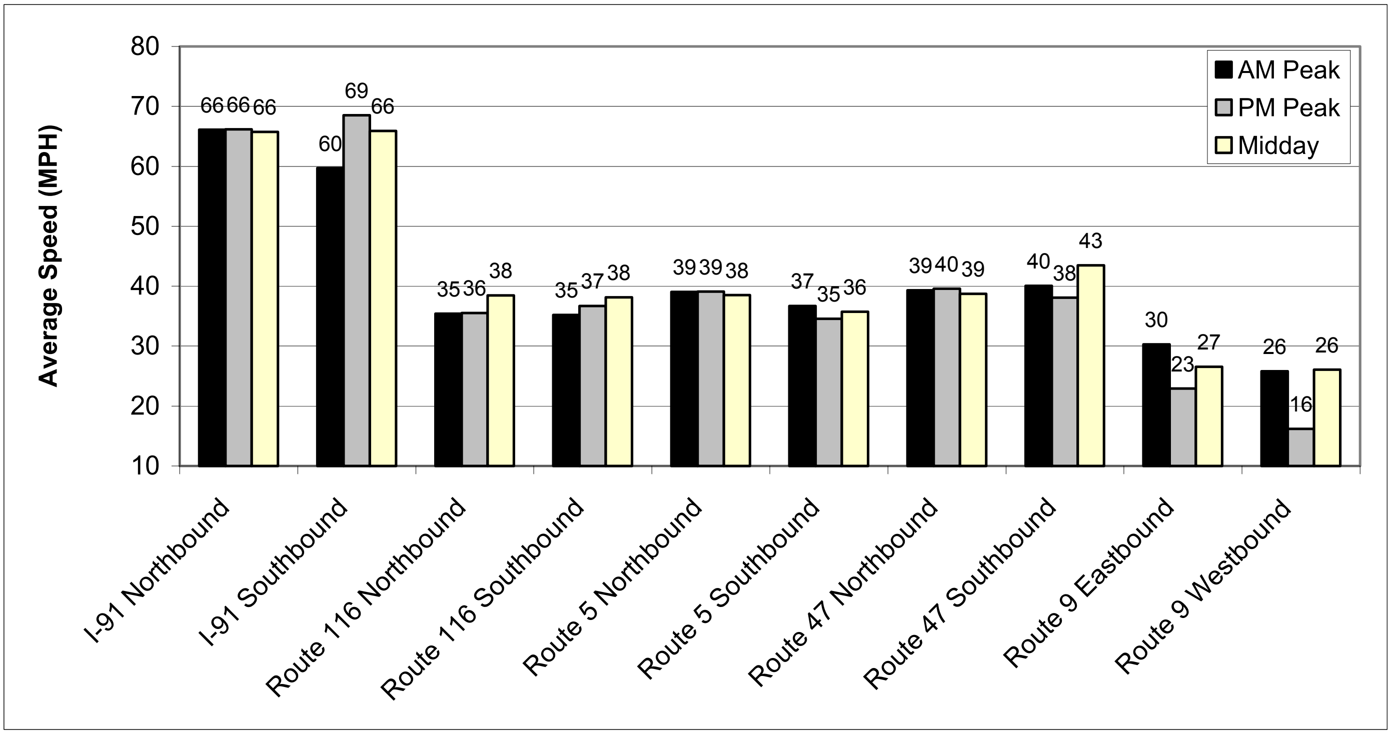
Travel time data were collected for the following highway segments for each direction of travel:

- **I-91**, between Interchange 17 (Holyoke) and Interchange 24 (Whately);

- ➤ **Route 116**, between Route 202 (Holyoke) and I-91 Interchange 24 (Whately);
- ➤ **Route 5**, between Route 9 (Northampton) and I-91 Interchange 24 (Whately);
- ➤ **Route 47**, between Route 116 (South Hadley) and Route 116 (Sunderland); and
- ➤ **Route 9**, between Route 5 (Northampton) and Route 116 (Amherst).

The average travel speeds are shown on Figure 2-12.

Figure 2-12
Average Travel Speed Comparisons (shown in miles-per-hour)



The speed data depicted on Figure 2-12 show that for the majority of the highway links in the study area there is no significant variation in travel speed during peak and off peak conditions with the exception of Route 9. On Route 9 from Northampton to Amherst, the evening peak hour average travel speed is much lower than the morning or midday periods.

2.3.1 North-South Travel

I-91

I-91 is classified as an Interstate facility, meaning there are limited access points with higher speeds. Travel time observations on I-91 northbound were practically identical for the morning, midday, and evening periods of the day. Travel times on the 19.5-mile segment of I-91 northbound from Holyoke to Whately averaged 17 minutes with an average speed of 66 miles per hour (MPH).

Travel times on I-91 southbound from Whately to Holyoke varied more by time of day where the morning peak hour trip took approximately 2 minutes longer than midday and evening peak hour conditions. The average travel speed during the morning peak hour was 60 MPH compared to 66 MPH during the midday and 69 MPH in the evening peak hour.

Route 116

Travel times on Route 116 northbound were somewhat shorter during the morning and evening peak when compared to the midday conditions. The average travel speed on Route 116 northbound from Route 202 to Sunderland was between 35 MPH and 38 MPH. Travel times on Route 116 southbound did not vary by time-of-day to a noticeable extent. The average travel speed on Route 116 southbound from Sunderland to Route 202 was between 35 MPH and 38 MPH.

Route 5

Travel times on the 10.5-mile segment of Route 5 northbound between Northampton and Whately did not vary notably by time-of-day. The average speed on Route 5 northbound was 38 MPH to 39 MPH. The segment of Route 5 northbound between Route 9 at Northampton Center and I-91 Interchange 20 exhibited the lowest travel speeds (20 to 25 MPH).

Travel times on Route 5 southbound between Whately and Northampton were slightly shorter during the morning and evening periods when compared to midday conditions. The average speed on Route 5 southbound was between 35 MPH and 37 MPH. Similar to Route 5 northbound, segment of Route 5 southbound between I-91 Interchange 20 and Route 9 in Northampton Center showed the lowest travel speeds (17 to 23 MPH).

Route 47

As shown on Figure 2-12, travel time did not vary by time of day for the 17.0-mile segment of Route 47 northbound between South Hadley and Sunderland. The average travel speed on Route 47 northbound was 39 MPH to 40 MPH. Route 47 southbound from Sunderland to South Hadley exhibited longer morning and evening peak hour travel times when compared to midday conditions. The average peak hour travel speed was 38 MPH to 40 MPH and the average midday travel speed was 43 MPH.

Summary

A summary of the north-south routes is presented below:

I-91 - Overall, low congestion was observed on the 19.5 miles of I-91 within the study area (between Holyoke and Deerfield). As a major interstate, the ability to travel at faster speeds makes this route an attractive north-south connection. Approximate travel times are 16 to 19 minutes with a slightly longer travel time in the southbound direction during peak periods.

Route 47 - Route 47 runs approximately 17 miles between South Hadley and Sunderland. Average trip times between South Hadley and Sunderland were approximately 25 minutes. Route 47 is an attractive option for vehicles traveling to or from the Amherst/Hadley area. Route 47 can be accessed directly from these towns as opposed to having to travel Route 9 to access I-91.

Route 5 - Travel times of 16 to 19 minutes were experienced on the 10.5-mile segment of Route 5 northbound between Northampton and Whately. Travel along the 20-mile segment between Holyoke and Deerfield would take approximately twice as long compared to using I-91. Because of the rural nature of the roadway, the presence of traffic signals in Holyoke and Northampton, and the fact that Route 5 runs directly under or parallel to I-91 throughout the study area, travel along the route is not likely a preferred alternative for regional traffic over I-91 under normal conditions.

Route 116 - Travel times along the 24.5-mile corridor of Route 116 vary from 37 to 43 minutes, with slightly longer travel times in the southbound direction during peak periods. Similar to Route 5, drivers are not expected to choose to travel the entire route instead of accessing I-91 because of the difference in travel time. However, because of Route 116's location, it is possible that shorter segments of Route 116 would be preferred over I-91. For example, travel between Amherst and Deerfield and Amherst and South Hadley would likely be preferred along Route 116 since the route runs directly through these towns.

2.3.2 East-West Travel

Route 9

Traffic generated by the numerous retail uses along Route 9 in Hadley results in longer travel times during the midday and evening peak hour. In the eastbound direction (toward Amherst), travel from Northampton Center to Amherst Center took approximately 14 minutes with an average travel speed of 30 MPH in the morning peak hour. During the midday, the trip from Northampton to Amherst took 16 minutes with an average speed of 27 MPH. For the evening peak hour, this trip took approximately 19 minutes with an average speed of 23 MPH. Traffic generated by retail uses compounding commuter and other traffic on Route 9 cause this time-of-day congestion on Route 9 eastbound.

Travel on Route 9 westbound is influenced by both retail uses on Route 9 and by current construction activity on the Coolidge Bridge, resulting in much higher longer travel times in the evening when compared to the morning or midday periods. Travel from Amherst Center to Northampton Center took approximately 17 minutes during the morning and midday periods – averaging 26 MPH. This same trip during the evening peak hour took 26 minutes with average speeds of 16 MPH.

Observed evening peak hour travel times on Route 9 eastbound were 3 minutes longer than midday travel times. In the westbound direction, the slowest average speeds occur from Route 47 west to the Coolidge Bridge. At times, westbound traffic from the bridge reconstruction can exacerbate these slow average speeds.

There are three key bottlenecks along Route 9 in the vicinity of the Coolidge Bridge based on travel time observations. They are:

- the intersection of Route 9 and Damon Road/I-91 Interchange 19 off-ramp;
- the intersection of Route 9 and Bay Road; and
- the Coolidge Bridge.

The bottleneck on the bridge is currently being addressed by MassHighway with the ongoing reconstruction efforts. The bottleneck at Route 9 and Bay Road will be addressed by MassHighway with the planned widening of Route 9 to four lanes.

2.4 Safety Assessment

A safety analysis was conducted for the key intersections in the study area to determine if the traffic volumes being placed on the roadways combined with the geometric conditions of the roadways or ramps raise potential safety concerns. Safety deficiencies were determined from three sources:

1. MassHighway “High Crash Location” listing for 1996 to 1998;
2. Franklin Regional Council of Governments (FRCOG) “Hazardous Intersection” listing for 1995 to 1997; and
3. Calculated crash rates for study area intersections using data from 1998 to 2000.

Crash data are compiled by the Registry of Motor Vehicles for the entire state of Massachusetts. These crash data are made available to the municipalities and planning agencies. The registry data includes crashes reported by State Police, local police and operators. Crashes that involve a fatality, personal injury, or property damage to any one vehicle of $1,000 or more are reported.

2.4.1 High Crash/Hazardous Intersections

MassHighway and the FRCOG compiled crash data over a 3-year period and determined high crash locations (HCLs) and hazardous intersections by weighting the crashes based on frequency and severity of crashes. Table 2-4 summarizes the HCLs and the hazardous intersections in the study area. These locations are also depicted on Figure 2-13.

Table 2-4
High Crash Locations and Hazardous Intersections

MassHighway High Crash Locations (HCLs) [1]

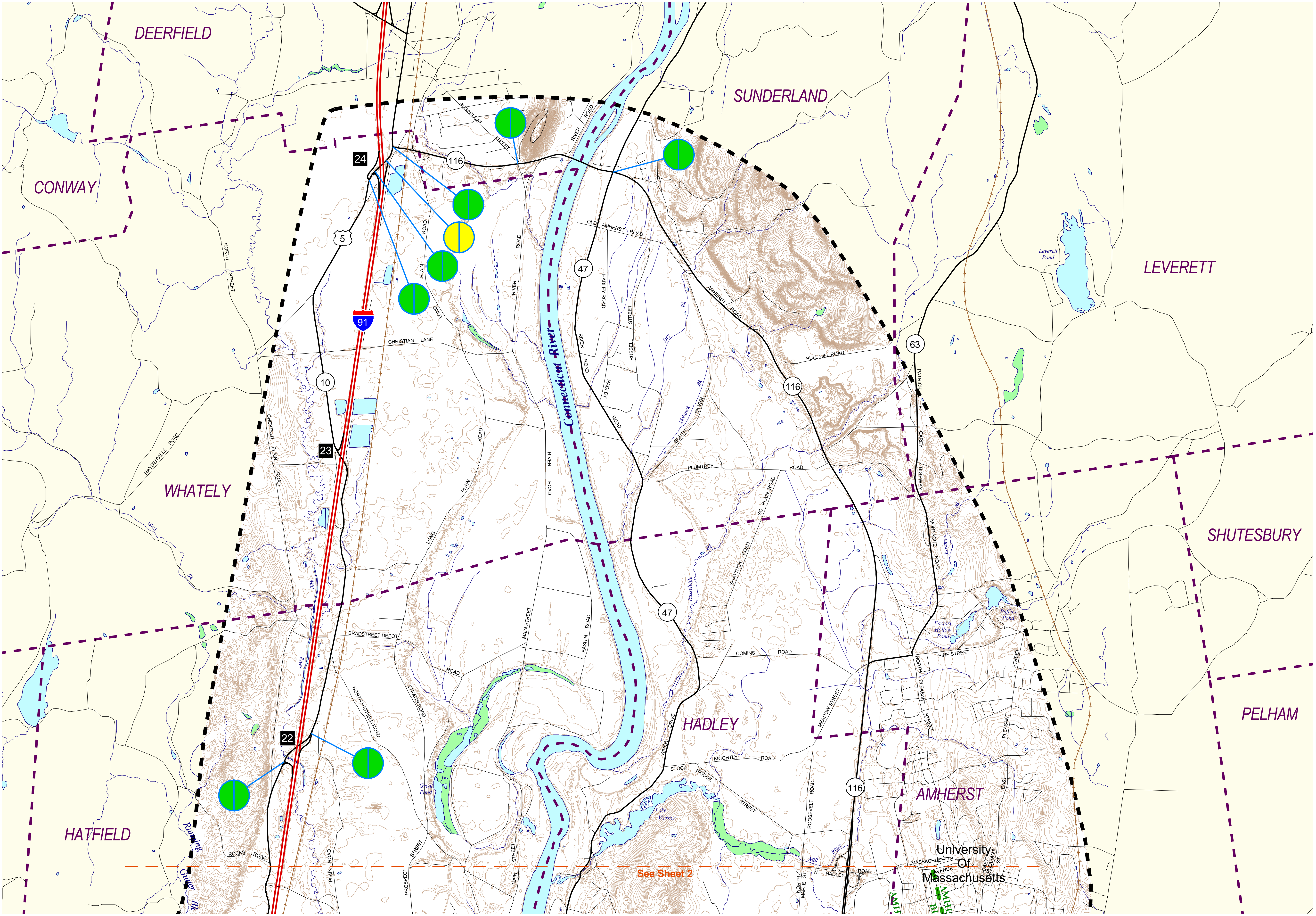
City	Street	Intersecting Street
Hadley	Russell Street (Rte 9)	South Maple Street
Hadley	Middle Street (Rte 47)	Russell Street (Rte 9)
Hadley	Bay Road	Russell Street (Rte 9)
Hadley	Russell Street (Rte 9)	Aquavitae Road
Holyoke	Hampden Street (Rte 141)	Northampton Street (Rte 5)
Northampton	Bridge Street (Rte 9)	Damon Road
Northampton	Conz Street	Pleasant Street (Rte 5)
Northampton	Damon Road	King Street (Rte 5)

FRCOG Hazardous Intersections [2]

City	Street	Intersecting Street
Deerfield	Route 116	River Road
Deerfield	Route 116	Sugarloaf Street
Deerfield	Sugarloaf Street/Elm Street	Route 5/10
Sunderland	Route 116	Route 47
Whately	I-91 Interchange 24	Route 5/10

1 Source: MassHighway, using data from 1997 to 1999.
2 Source: FRCOG, using data from 1995 to 1997.

From the MassHighway data, there are 8 high crash locations in the study area. Many of the high crash locations are along the Route 9 corridor. Safety assessments from the FRCOG were reviewed to identify any other potential areas of concern for safety. In the study area, there are 5 locations identified as "hazardous intersections" by the FRCOG.



MASS HIGHWAY

Connecticut River Crossing Transportation Study

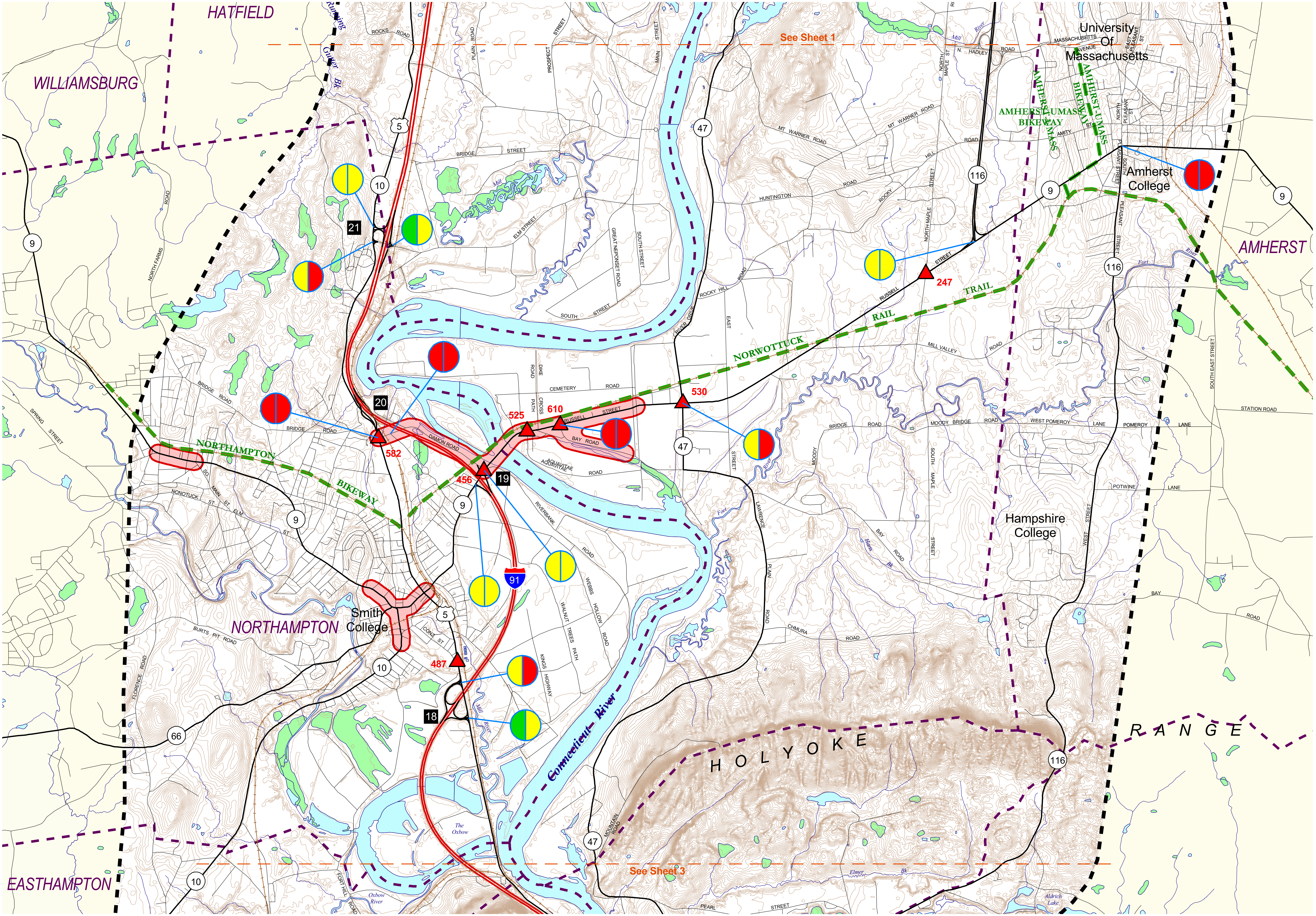
Figure 2-13 Existing Conditions Safety Assessment & Level of Service

(Sheet 1 of 3)

Source: MassGIS, MassHighway, PVPC, FRCOG.

Graphic File: \\Mawatr\GIS\08036\PS-PDF\ExCondSA&LOS_Fig2-13-1.pdf
Application Source: \\Mawatr\GIS\08036\Apr-MXD\ct_river_crossing_3.apr

*MassHighway uses a weighted average where crashes involving a fatality or personal injury are weighted higher than crashes involving property damage only.



Study Area
Rail
Approx. 10' Elev. Contours
Town Boundary
Rail Trail / Bikeway
River, Stream, Lake or Pond
Wetland or Marsh Area
# Interchange
Level-of-Service (LOS)
PM Peak Hour
AM Peak Hour
● - LOS A/B
● - LOS C/D
● - LOS E/F
MassHighway Listed High Crash Location
XXX
Overall Rank of Location (1 = Highest Weighted Average*)
Problem Locations Identified by Pioneer Valley Region Congestion Management System

Connecticut River Crossing Transportation Study

Figure 2-13
Existing Conditions
Safety Assessment &
Level of Service

(Sheet 2 of 3)

Source: MassGIS, MassHighway, PVPC, FRCOG.

Graphic File: \\Mawat\GIS\08036\PS-PDF\ExCondSA&LOS_Fig2-13-2.pdf
Application Source: \\Mawat\GIS\08036\Apr-MXD\ct_river_crossing_3.apr

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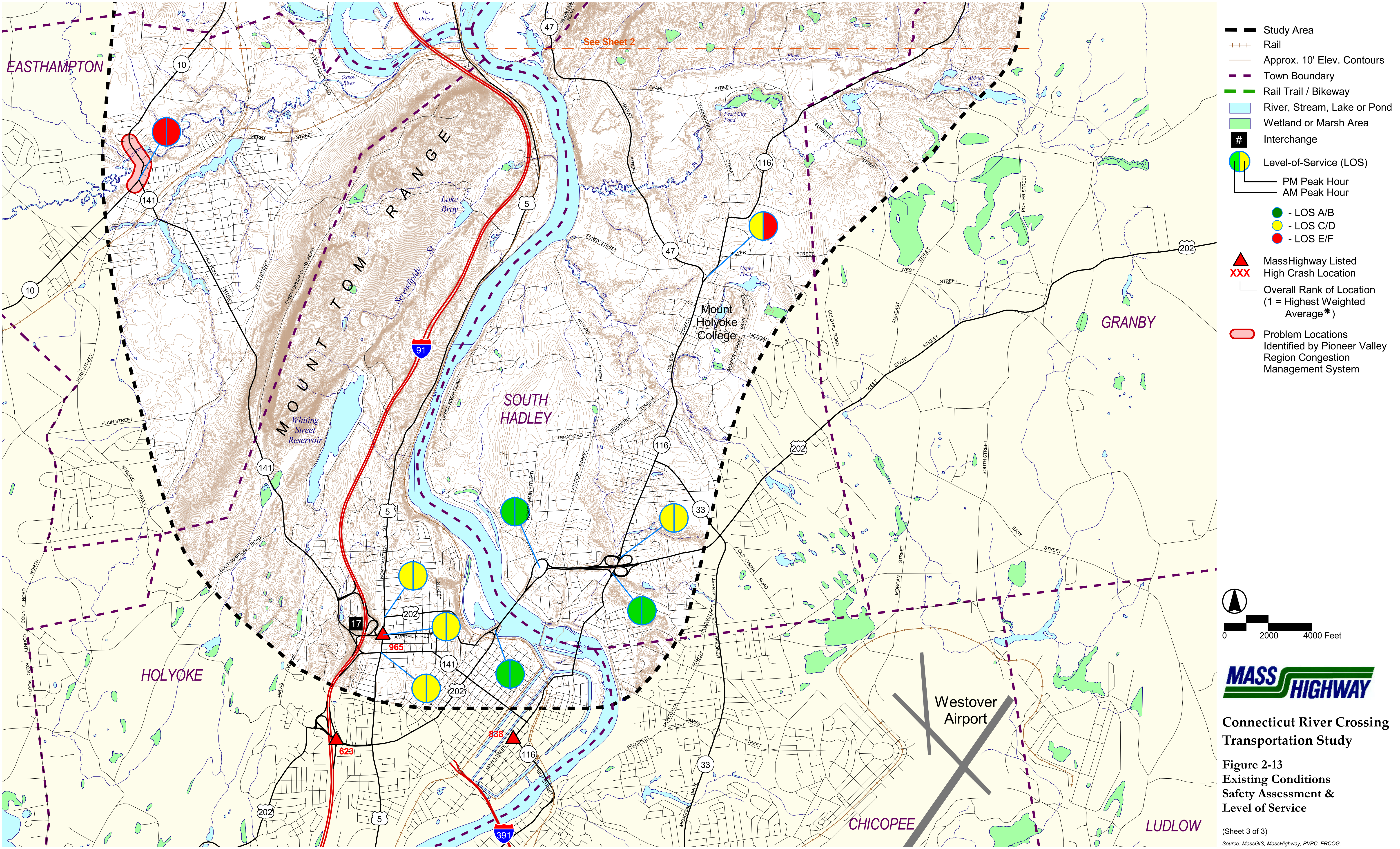
* MassHighway uses a weighted average where crashes involving a fatality or personal injury are weighted higher than crashes involving property damage only.

** Analysis reflects conditions without lane restrictions from the Coolidge Bridge reconstruction.



Connecticut River Crossing Transportation Study

Figure 2-13
Existing Conditions
Safety Assessment &
Level of Service

(Sheet 3 of 3)

Source: MassGIS, MassHighway, PVPC, FRCOG.

Graphic File: \\Mawat\GIS\08036\PS-PDF\ExCond\SA&LOS_Fig2-13-2.pdf
Application Source: \\Mawat\GIS\08036\Apr-MXD\ct_river_crossing_3.apr

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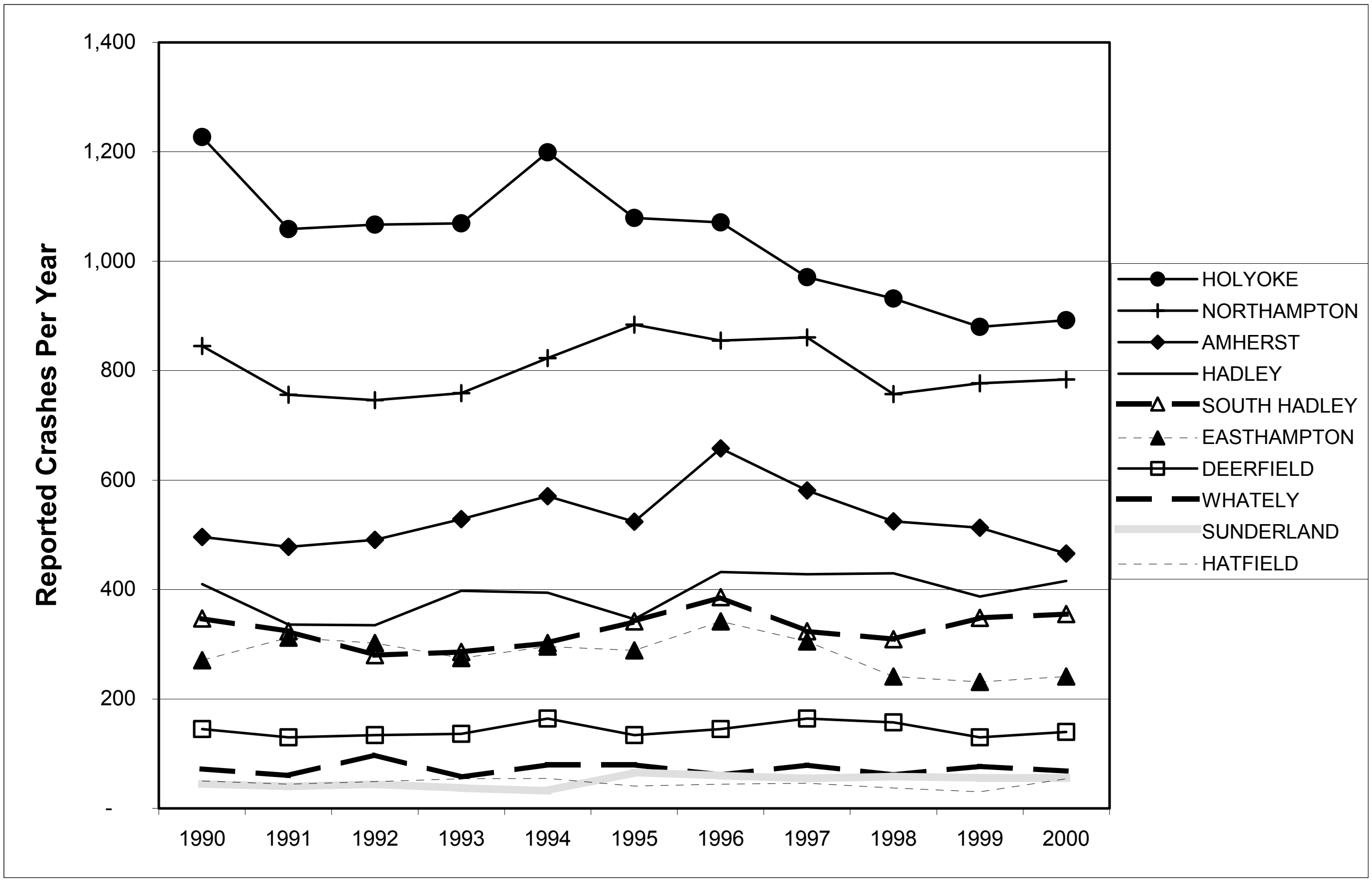
* MassHighway uses a weighted average where crashes involving a fatality or personal injury are weighted higher than crashes involving property damage only.

** Analysis reflects conditions without lane restrictions from the Coolidge Bridge reconstruction.

2.4.2 Crash Data for Study Area Communities

Figure 2-14 depicts the total number of reported crashes from the registry database for the study area communities.

Figure 2-14
Reported Crashes for Study Area Communities



Source: MassHighway Crash Data

Figure 2-14 shows that the study area communities where the highest frequency of crashes occurred from 1990 to 2000 were Holyoke, Northampton, Amherst, and Hadley. The communities of Deerfield, Whately, Sunderland, and Hatfield experienced the lowest occurrence of crashes. From 1990 to 2000, the crash occurrence is relatively steady for the majority of the study area, as noted by the relatively horizontal lines on Figure 2-14. The only exceptions are Holyoke Amherst, and Easthampton where the crash frequency has generally decreased over the years.

2.4.3 Crash Data for Study Area Key Intersections

For each intersection, the 3-year crash frequency and the peak hour traffic volumes entering the intersection were used to calculate a crash rate. The crash rate, expressed in crashes per million entering vehicles (MEV), provides an indication of the crash frequency and severity relative to the traffic served by the intersection. These crash rates can be compared to the average rates for the area to help discern the problem locations. The average crash rates for MassHighway District 2 for 2002 were 1.11 crashes per MEV for signalized intersections and 0.90 crashes per MEV for unsignalized intersections. Table 2-5 summarizes the crash data for each key intersection by period, severity, and type.

For the signalized intersections, the intersection of Route 9 and Route 47 in Hadley experienced the highest occurrence of crashes and the highest crash rate – 57 crashes over the three-year period from 1998 to 2000 with a rate of 1.86 crashes per MEV. The intersection of Route 9 and Damon Road had 47 crashes from 1998 to 2000 with a rate of 1.13 crashes per MEV. These two intersections have crash rates at or above the average for the area, as determined by MassHighway.

A majority of the reported crashes occur at the study area intersections during the weekday off-peak hours (9:00AM – 4:00PM). The severity of each crash is categorized as a fatality, personal injury, or property damage crash. A high frequency of personal injury accidents is usually attributable to higher vehicle speeds or rear-end/head-on type collisions. There were no fatal crashes occurring at any of the study area intersections. The frequency of personal injury crashes exceeded 50 percent at the following four intersections:

- Route 5/10 at Elm Street, Northampton – 71 percent
- Route 5 at Route 202, Holyoke – 67 percent
- Route 9 at Route 116, Hadley – 65 percent
- Route 116 at Sugarloaf Street, Deerfield – 60 percent

The type of crash is categorized as angle, head-on, rear-end, or unknown. The majority of the intersections experience angle or rear-end crashes. Rear-end collisions may indicate limited sight distance approaching the intersection. Locations where the majority of the crashes are rear-end collisions are:

- Route 10 at Route 141, Easthampton – 90 percent
- Route 5/10 at I-91 Exit 24, Whately – 75 percent
- Route 116 at Route 47, South Hadley – 71 percent
- Route 9 at Bay Road, Hadley – 67 percent
- Route 9 at Route 116, Amherst – 64 percent
- Route 9 at Route 116, Hadley – 53 percent
- Route 9 at Damon Road/I-91, Northampton – 53 percent
- Route 202 rotary at Muller Bridge, South Hadley – 53 percent

Table 2-5
Crash Data Summary Using 1998, 1999, and 2000 Data

Intersection	Crash[1] Rate (MEV)	Year			Total # Acc	Period[2]			Severity[3]			Type[4]			
		98	99	00		AM Pk	PM Pk	O	Fat	Inj	PDO	Ang	HO	RE	Unk
Signalized															
Route 9 at Route 116 (Amherst)	**0.48**	5	4	5	**14**	2	2	10	0	7	7	5	0	9	0
Route 5 at Route 141/Hampden Street (Holyoke)	**0.89**	11	11	4	**26**	5	4	17	0	12	14	18	4	0	4
Route 5 at Route 141/Dwight Street (Holyoke)	**0.48**	6	6	2	**14**	2	1	11	0	6	8	4	6	0	4
Route 9 at Bay Road (Hadley)	**0.68**	6	10	11	**27**	6	6	15	0	7	20	7	0	18	2
Route 9 at Route 47 (Hadley)	**1.86**	19	18	20	**57**	6	8	43	0	26	31	31	4	18	4
Route 9 at Route 116 (Hadley)	**0.50**	4	8	5	**17**	0	1	16	0	11	6	6	0	9	2
Route 9 at Damon Road/I-91 (Northampton)	**1.13**	12	18	17	**47**	7	8	32	0	13	34	19	1	25	2
Route 5 at Damon Road/Bridge Road (Northampton)	**0.89**	12	12	10	**34**	3	7	24	0	10	24	17	1	11	5
Route 116 at Route 47 (Sunderland)	**0.61**	5	4	5	**14**	3	3	8	0	4	10	6	2	2	4
Route 10 at Route 141 (Easthampton)	**0.29**	3	6	1	**10**	0	3	7	0	5	5	0	0	9	1
Route 5/10 at Route 116 (Whately)	**0.42**	2	4	4	**10**	1	1	8	0	3	7	3	1	3	3
Route 116 at Sugarloaf Street (Deerfield)[5]	**0.82**	5	7	3	**15**	3	1	11	0	9	6	10	0	5	0
Route 5 at I-91 Exit 18 (Northampton)	**0.82**	6	6	4	**16**	0	3	13	0	7	9	8	7	0	1
Unsignalized															
Route 5 at Route 202 (Holyoke)	**0.22**	3	0	0	**3**	0	0	3	0	2	1	1	1	1	0
I-91 Exit 22 at Route 5 (Hatfield)	**0.32**	0	0	2	**2**	0	0	2	0	0	2	0	0	0	2
Route 9 at I-91 Southbound on-ramp (Northampton)	**0.36**	2	2	4	**8**	1	2	5	0	2	6	5	0	0	3
Route 5 at I-91 Exit 21 southbound ramps (Northampton)	**0.18**	0	0	2	**2**	1	1	0	0	1	1	2	0	0	0
Route 5/10 at Elm Street (Northampton)	**0.45**	4	2	1	**7**	2	2	3	0	5	2	3	0	4	0
Damon Road at Industrial Drive (Northampton)	**0.34**	2	3	3	**8**	3	0	5	0	3	5	4	1	3	0
Route 116 at Bay Road (Amherst)	**0.55**	2	5	2	**9**	1	1	4	0	6	3	6	0	3	0
Route 116 at Route 47 (South Hadley)	**1.09**	6	6	2	**14**	4	3	7	0	5	9	2	1	10	1
Route 202 at Route 116 (South Hadley)	**0.29**	0	2	4	**6**	2	1	3	0	2	4	2	1	3	0
Route 202 Rotary at Mueller Bridge (South Hadley)	**N/A**	6	2	7	**15**	1	2	12	0	6	9	4	2	8	1
Route 5/10 at I-91 Exit 24 northbound off-ramp (Whately)	**0.87**	4	4	7	**15**	1	3	11	0	2	13	1	1	5	8
Route 5/10 at I-91 Exit 24 southbound on-ramp (Whately)	**1.54**	2	3	3	**8**	1	0	7	0	3	5	3	0	3	2
Route 5/10 at I-91 Exit 24 southbound off-ramp (Whately)	**0.80**	1	0	3	**4**	0	0	4	0	2	2	1	0	3	0

Note: The MassHighway District 2 average crash rate is 1.11 crashes per MEV for signalized intersection and 0.90 crashes per MEV for unsignalized intersections.

1 Crash Rate (MEV) = Crash rate per million entering vehicles as calculated using the MassHighway Crash Rate Worksheet Standard Procedures, 2/99.
2 AM Pk = AM Peak Period, PM Pk = PM Peak Period, O= Other.
3 Fat = Fatality, Inj = Injury Accident, PDO = Property Damage Only.
4 Ang = Angle, HO = Head-On, RE = Rear-End, Unk – Unknown
5 This location was unsignalized until October 1999.

Angle-type crashes are typically the result of conflicts between turning vehicles or between drivers making lane changes. Locations that experience largely angle type crashes include:

- ➤ Route 5 at Hampden Street, Holyoke – 69 percent
- ➤ Route 116 at Sugarloaf Street, Deerfield – 67 percent

- Route 9 at I-91 southbound Exit 18, Northampton – 63 percent
- Route 9 at Route 47, Hadley – 54 percent

2.4.4 Observed Safety Issues

There are several potential safety issues at the key study area intersections based on field observations. These potential issues do not necessarily result in frequent occurrence of crashes.

At the intersection of Route 10 and Route 141 in Easthampton, there is a potential geometric deficiency that may raise safety issues. The traffic signal at the intersection is programmed to provide a lead phase for southbound traffic where northbound traffic is held on red for approximately 10 seconds to allow the southbound left-turn movement onto Route 141 to process unimpeded until the lead phase ends. The signal equipment is outdated, and does not provide indication to the southbound traffic when the lead phase has ended (i.e. a green, yellow, red turning arrow). The southbound left-turns are abruptly opposed by northbound traffic without advance warning.

At the intersection of Route 9 and Damon Road/I-91 northbound off-ramp, the off-ramp occasionally queues onto the I-91 northbound mainline during peak conditions. This presence of ramp queues on the I-91 mainline may raise safety concerns for both ramp and mainline drivers. This interchange is a key gateway to the region.

For the unsignalized intersections, the Route 202 rotary in South Hadley and the I-91 northbound off-ramp at exit 24 in Whately each had 15 crashes occurring from 1998 to 2000. The intersections of Route 116/47 in South Hadley and I-91 Exit 24 at Route 5/10 in Whately had crash rates that were above average for the area.

The accident data do not provide sufficient detail to determine how many crashes at the Route 202 Mueller Bridge occur at the U-turn on the Holyoke side of the bridge. At this U-turn, there is limited sight distance for U-turn drivers looking east for gaps in traffic on Route 202 westbound. The high vehicle speeds on Route 202 westbound and the limited sight distance for U-turns makes it difficult for U-turns to proceed.

2.4.5 Summary

There are several intersections in the study area that could have potential safety issues based on a review of accident data from MassHighway and FRCOG. From the MassHighway data, there are 10 high crash locations in the study area. There are also 6 locations identified as “hazardous intersections” by the FRCOG (see Figure 2-13).

The study area communities where the highest frequency of crashes occurred from 1990 to 2000 were Holyoke, Northampton, Amherst, and Hadley. The communities of Deerfield, Whately, Sunderland, and Hatfield experienced the lowest occurrence of crashes.

For the signalized intersections, the intersection of Route 9 and Route 47 in Hadley experienced the highest occurrence of crashes – 57 crashes over the three-year period from 1998 to 2000. The intersection of Route 9 and Damon Road had 47 crashes from 1998 to 2000. For the unsignalized intersections, the Route 202 rotary in South Hadley and the I-91 northbound off-ramp at exit 24 in Whately each had 15 crashes occurring from 1998 to 2000.

The frequency of personal injury crashes exceeded 50 percent at the following locations:

- Route 5/10 at Elm Street, Northampton – 71 percent
- Route 5 at Route 202, Holyoke – 67 percent
- Route 9 at Route 116, Hadley – 65 percent
- Route 116 at Sugarloaf Street, Deerfield – 60 percent

The majority of the crashes involved rear-end collisions at the following locations:

- Route 10 at Route 141, Easthampton – 90 percent
- Route 5/10 at I-91 Exit 24, Whately – 75 percent
- Route 116 at Route 47, South Hadley – 71 percent
- Route 9 at Bay Road, Hadley – 67 percent
- Route 9 at Route 116, Amherst – 64 percent
- Route 9 at Route 116, Hadley – 53 percent
- Route 9 at Damon Road/I-91, Northampton – 53 percent
- Route 202 rotary at Muller Bridge, South Hadley – 53 percent

Locations that experience predominantly angle type crashes include:

- Route 5 at Hampden Street, Holyoke – 69 percent
- Route 116 at Sugarloaf Street, Deerfield – 67 percent
- Route 9 at I-91 southbound Exit 18, Northampton – 63 percent
- Route 9 at Route 47, Hadley – 54 percent

Other potential observed intersection issues are:

- At the intersection of Route 10 and Route 141 in Easthampton, there is a potential safety deficiency resulting from outdated signal equipment that does not provide indication to the southbound traffic when the lead phase has ended. This results in a condition where southbound left-turns are abruptly opposed by northbound traffic without advance warning.

- At the intersection of Route 9 and Damon Road/I-91 northbound off-ramp, the off-ramp occasionally queues onto the I-91 northbound mainline, raising potential safety concerns for both ramp and mainline drivers.

- There is limited sight distance for U-turns at the Route 202 Mueller Bridge on the Holyoke side of the bridge.

On a corridor level, the Route 9 corridor between Northampton-Hadley-Amherst has the greatest occurrence of high crash locations compared to other highway links in the study area.

2.5 Traffic Operations Assessment

Understanding the relationship between the supply and demand on a roadway is a fundamental consideration in evaluating how well a transportation facility fulfills its objective to safely and efficiently accommodate the traveling public. The assessment of traffic operations provides a technical evaluation of the operational qualities of the key intersections using the procedures documented in the *2000 Highway Capacity Manual*[1]. This section presents the details of the traffic operations assessment for the study area intersections.

2.5.1 Level Of Service

Level of Service (LOS) is a qualitative measure used to describe operational conditions. LOS incorporates factors such as speed, travel time, freedom to maneuver, and traffic interruptions. Similar to a school report card, LOS is designated on levels A through F, with LOS A representing the best operating conditions and LOS F the worst.

When determining LOS, two key outputs are calculated, volume to capacity (v/c) ratios and average delay. Volume to capacity ratios are calculated for each lane group and for the intersection as a whole. Average delay is calculated for each lane, each approach, and the intersection as a whole.

LOS is a measure of the delay incurred by motorists at signalized intersections. In some instances, poor progression or unnecessarily long signal cycle length will cause a high delay even though the v/c ratio indicates sufficient capacity. It is also possible to have acceptable delay when v/c ratios exceed 1.0. Because these conditions are possible, analysis should consider the results of both delay and v/c calculations.

---

[1] 2000 Highway Capacity Manual; Transportation Research Board, National Research Council; Washington D.C. 2000

Any v/c ratio greater than 1.0 is an indication of an actual or potential breakdown of traffic operations. In some cases, the overall v/c ratio will be less than 1.0 while some lanes of the intersection are greater than 1.0. When this is the case, signal timing can often be adjusted to restore operations to acceptable conditions. When a critical lane v/c ratio is greater than 1.0, it is likely that the overall signal and geometric design are inadequate to process the existing traffic. In these cases more comprehensive improvements may be necessary.

2.5.2 Method of Determining LOS

Several analytical software tools are used to determine LOS depending on the type of control at the intersection. SYNCHRO 5.0 software is used for signalized intersections, HCS 2000 software for unsignalized intersections, and SIDRA 5.30 software for rotary operations. The software uses inputs such as volumes, geometry, signal timing (if applicable), and pedestrian and parking maneuvers to assign a LOS rating.

The LOS procedure looks at the performance of the intersection on an hourly basis. The morning and evening peak hour periods are the two hourly intervals used to determine an intersections LOS rating. Morning and evening peak hour traffic volumes and the geometric conditions at the key intersections are the key inputs to the software. The morning and evening traffic volumes at the study area intersections were obtained from MassHighway, the PVPC, and the FRCOG. Additional field counts were also conducted at several locations in April 2002. All traffic data were collected on a typical weekday, when the area schools were in session.

For signalized and unsignalized intersections, level of service is defined in terms of average control delay per vehicle. Control delay includes stopped time and the time required to decelerate, move forward in the queue, and accelerate. For unsignalized intersections, the analysis assumes that traffic on the main street is not affected by traffic on the side street and therefore estimates the level of service for left-turns from the main street onto the side street and for all movements from the side street. For signalized intersection, level of service is determined for all approaching movements.

The Highway Capacity Manual does not present a recommended LOS for design purposes, rather it offers a description of the conditions associated with each level of service. For example, LOS C is described in the manual as stable operating conditions. As conditions deteriorate to LOS D or E, the HCM describes conditions with words such as unstable flow. LOS E or F are generally considered unacceptable conditions.

2.5.3 Results

Table 2-6 presents the capacity analysis results for the key signalized intersections within the study area. The results are also depicted on Figure 2-13. The deficient intersections are indicated below:

- **Route 10 at Route 141 (Easthampton)** – This intersection is located at the center of Easthampton where there are heavy pedestrian volumes and bicyclists between Route 10 and Route 141. At this intersection, Route 10 is over capacity in the southbound direction in the morning and evening peak hours resulting in LOS F operations. Route 141 westbound experiences delays and queues resulting in LOS F conditions in the evening peak hour. The traffic signal equipment at this intersection is outdated and does not provide indication to the southbound traffic when opposing northbound traffic has been released, creating a safety concern and negatively influencing overall operations. On Route 141, a protected phase for right-turns onto Route 10 northbound is not effectively utilized because most motorists were observed looking away from the signal waiting for a gap in advancing traffic, unaware of the protected signal phase.

- **Route 9 at Damon Road/I-91 northbound off-ramp (Exit 19, Northampton) –** This intersection is one of the most congested locations in the study area. Three of the four approaches, Route 9 westbound, Damon Road southbound, and the I-91 off-ramp have heavy volumes entering the intersection. Because the off-ramp and Damon Road are skewed and since Damon Road has dual left-turn lanes, the traffic signal uses a split phase operation. Under a split phase operation, Damon Road traffic processes traffic on a separate phase than the off-ramp, resulting in added inefficiencies. In the evening peak hour, delays and long queues occur on the off-ramp and Damon Road resulting in LOS E/F operations. This intersection is the bottleneck which causes queues that extend to the Coolidge Bridge, on the I-91 northbound off-ramp, and on Damon Road southbound.
- **Damon Road/Bridge Road at N. King Street (Route 5/10, Northampton) –** LOS deficiencies occur on Damon Road in the evening peak, on Bridge Road during both morning and evening peaks, and Route 5/10 northbound during both peak conditions. Heavy entering volumes on all approaches coupled with considerable left-turns contribute to the inefficient operation of this intersection.
- **Route 9 at Route 47 (Hadley)** – This intersection operates at LOS E during the evening peak hour because of the heavy traffic on Route 9 westbound. Similar to the Bay Road intersection, the westbound approach operates at LOS F in the evening peak. This intersection is influenced by frequent pedestrian movements in the evening peak hour. Left-turns onto Route 47 frequently block through traffic because of the lack of exclusive turning lanes.
- **Route 9 at Route 116 (Hadley)** – The eastbound left-turn movement onto Route 116 operates at LOS E during the morning peak hour. The traffic signal timing gives priority to Route 9 through traffic, resulting in higher delays for left-turns

onto Route 116. Although the delays are high, the left-turn queue was not observed to be extensive.

- **Route 9 at Route 116 (Amherst)** – This intersection operates at LOS F during both the morning and evening peak hours. The Route 9 eastbound and westbound approaches to the intersection experience long delays and queues that result in a LOS F operation. This condition occurs during both peak periods.

Table 2-7 presents the capacity analysis for the unsignalized intersections within the study area. The unsignalized intersections that experience LOS E or F conditions are:

- **Damon Road at Industrial Drive (Northampton) –** LOS E/F operations occur in the morning and evening peak hour periods;
- I**-91 southbound ramps (Exit 18) at Route 5 (Northampton) –** LOS E operations for off-ramp traffic in the evening peak hour;
- **Elm Street at Route 5/10 (Northampton) –** LOS E operations occur for Elm Street traffic in the evening peak hour; and
- **Route 116 at Route 47 (South Hadley) –** LOS E operations occur for traffic turning onto Route 116 from Route 47 (there is also through traffic that is impeded by the lack of adequate gaps in traffic on Route 116).

Although not study area intersections, there are two intersections just east of the Coolidge Bridge that effect traffic flow on Route 9. Full access between Route 9 and Aqua Vitae Road (just east of the bridge) results in a difficult left-turn onto Route 9 during peak conditions. Also, in the westbound direction, left-turns onto Aqua Vitae Road at times block through traffic. The other location of concern near the bridge is Route 9 and Cross Path Road where left-turns from Route 9 eastbound onto Cross Path Road exacerbate the delays and queues on Route 9 when through traffic cannot maneuver around left-turning vehicles. Before the start of the reconstruction of the Coolidge Bridge, Cross Path Road was used by many drivers as a bypass of Route 9 to get to Route 47 or UMass. With the Coolidge Bridge reconstruction, access to Cross Path Road from Route 9 has been prohibited by construction barrels and signs. Right-turns onto Route 9 are allowed from Cross Path Road. MassHighway has developed plans that will permanently make the Cross Path Road right-turn-out only. These plans also provide an exclusive left-turn lane on Route 9 westbound at Aqua Vitae Road and at the Marina Driveway.

Table 2-6
Signalized Intersection Level-of-Service Summary
2002 Existing Conditions

		2002 Existing Conditions LOS*	
Signalized Intersections	Approach	AM PEAK	PM PEAK
Route 10 at Route 141	**Overall**	**F**	**F**
Easthampton	Route 10 Northbound	B	B
	Route 10 Southbound	**F**	**F**
	Route 141 Westbound	**D**	**F**
Route 5/10 at Route 141/I-91 Exit 17 Off-ramps	Overall	C	C
Holyoke	Route 141 Eastbound	D	D
	Northbound Route 5	B	C
	Southbound Route 5	B	B
Route 5/10 at route 141/I-91 Exit 17 On-ramps	Overall	C	C
Holyoke	Route 141 Westbound	C	C
	Northbound Route 5	A	B
	Southbound Route 5	B	B
I-91 NB ramps (exit 18) at Route 5/10	Overall	B	C
Northampton	Eastbound Exit 18 Ramp	B	C
	Northbound Route 5/10	B	C
	Southbound Route 5/10	B	C
Route 9 at Damon Road/I-91 NB off-ramp	Overall	C	D
Northampton[1]	Route 9 Eastbound	C	C
	Route 9 Westbound	C	D
	I-91 northbound off-ramp	**D**	**E**
	Damon Road Southbound	**D**	**E**
Damon Road /Bridge Road at Route 5/10 (N. King Street)	**Overall**	**E**	**F**
Northampton	**Eastbound Bridge Road**	**F**	**F**
	Westbound Damon Road	**D**	**F**
	Northbound N. King Street	**F**	**F**
	Southbound N. King Street	D	D
Route 9 at Bay Road	Overall	D	C
Hadley	**Eastbound Route 9**	**E**	**C**
	Westbound Route 9	D	C
	Northbound Bay Road	D	C
Route 9 at Route 47	**Overall**	**C**	**E**
Hadley	Eastbound Route 9	D	C
	Westbound Route 9	**C**	**F**
	Northbound Route 47	C	C
	Southbound Route 47	C	C
Route 9 at Route 116	Overall	D	C
Hadley	**Route 9 Eastbound**	**E**	**C**
	Route 9 Westbound	B	C
	Westgate Drive Northbound	C	C
	Route 116 Southbound	D	D

* Level of Service

[1] LOS results reflect post Coolidge Bridge construction conditions.

Note: Locations in bold denote LOS E or F conditions during one or both peak periods.

Table 2-6 (continued)
Signalized Intersection Level-of-Service Summary
2002 Existing Conditions

Signalized Intersections	Approach	2002 Existing Conditions LOS* AM PEAK	 AM PEAK
Route 9 at Route 116	**Overall**	**F**	**F**
Amherst	**Route 9/116 Eastbound**	**F**	**F**
	College Street Westbound	**F**	**F**
	S. Pleasant Street Northbound	C	C
	N. Pleasant Street Southbound	C	C
Route 116 at Route 47	Overall	B	B
Sunderland	Route 116 Eastbound	B	B
	Route 116 Westbound	A	B
	Route 47 Northbound	C	C
	Route 47 Southbound	B	B
Route 116 at Sugarloaf Street	Overall	B	B
Sunderland	Eastbound Route 116	A	A
	Westbound Route 116	C	C
	Northbound Sugarloaf Street	B	A
	Southbound Sugarloaf Street	B	B
Route 116 at Route 5/10	Overall	B	B
Whately	Westbound Route 116	B	B
	Northbound Route 5	B	A
	Southbound Route 5	A	A

* LOS - Level of Service

Note: Entries in bold denote unacceptable LOS E or F conditions for traffic operations.

Table 2-7
Unsignalized Intersection Level-of-Service Summary
2002 Existing Conditions

Unsignalized Intersections	Location	2002 Existing Conditions LOS* AM PEAK	 PM PEAK
I-91 SB ramps (exit 18) at Route 5	**Northampton**	**C**	**E**
I-91 SB on-ramp (exit 19) at Route 9 [1]	Northampton	C	C
I-91 SB ramps (exit 21) at Route 5/10	Northampton	C	D
I-91 NB ramps (exit 21) at Elm Street	Northampton	B	C
Elm Street at Route 5/10	**Northampton**	**C**	**E**
Damon Road at Industrial Road	**Northampton**	**E**	**F**
Route 116 at Bay Road (east)	Amherst	B	C
Route 116 at Bay Road (west)	Amherst	C	C
I-91 NB off-ramp (exit 22) at Route 5/10	Hatfield	A	B
I-91 SB on-ramp (exit 22) at Route 5/10	Hatfield	A	A
I-91 SB on-ramp (exit 24) at Route 5/10	Whately	B	A
I-91 SB off-ramp (exit 24) at Route 5/10	Whately	B	B
I-91 NB off-ramp (exit 24) at Route 5/10	Whately	C	C
Route 202 (Lincoln Street) at Route 5	Holyoke	C	C
Route 202 Mueller Bridge U-Turn	Holyoke	B	B
Route 116 at Route 202 WB ramps	South Hadley	C	C
Route 116 at Route 202 EB ramps	South Hadley	B	B
Route 116 at Route 47	**South Hadley**	**D**	**E**

* LOS - Level of Service for the critical movement

1 LOS results reflect conditions without lane restrictions in place for the Coolidge Bridge reconstruction.

Note: Locations in bold denote unacceptable LOS E or F conditions for traffic operations during one or both peak periods.

2.5.4 Pioneer Valley Region CMS

The Pioneer Valley Congestion Management System (CMS) is a process that evaluates the transportation system, identifies problems and issues, and provides alternatives and solutions. The CMS is an on-going evaluation that is intended to improve transportation in the region. Table 2-8 summarizes the locations in the study area identified in the CMS as problem locations. These locations are also depicted on Figure 2-13.

Table 2-8
Pioneer Valley CMS Problem Locations

Community	Location	Priority
Easthampton	Route 10 and Route 141	Low
Hadley/Northampton	Route 9 Coolidge Bridge	High
Hadley	Bay Road from Middle Street to Route 9	High
Northampton	Damon Road and Bridge Road	High
Northampton	Route 10 (Old South Street to Main Street)	High
Northampton	Route 9 (Hawley Street to Prospect Street)	Medium
Northampton	Route 9 (Chestnut Street to North Maple Street)	Medium

Source: Pioneer Valley CMS Update on Status of Current CMS Projects; September 2001.
Priority – High (existing severe congestion); Medium (5-year timeframe for improvements); Low (5 to 10-year timeframe).

Route 10 (Easthampton) – The southbound segment of Route 10, specifically the approach to Route 141 and the approach to Williston Street are two areas of frequent congestion. High traffic volumes and inefficient signal operations are likely the cause of the congestion.

Route 141 (Easthampton) – The northbound segment of Route 141 is frequently congested between Route 10 and Williston Street. Similar to Route 10, this congestion is caused by high traffic demand and poor traffic signal operations.

In addition to this segment, Route 141 also experiences congestion between Chapel Street and Adams Street. This congestion is a result of existing parking and narrow lane widths.

Route 9 (Hadley/Northampton) – Severe congestion occurs on Route 9 eastbound between Bay Road and the Calvin Coolidge Bridge. This congestion is a result of two eastbound travel lanes merging into one lane just to the east of the bridge crossing.

Route 9 Westbound experiences congestion between West Street and Damon Road. On the Northampton side of the Coolidge Bridge, congestion is experienced at the intersection of I-91, Damon Road, and Route 9. Both the Route 9 westbound approach and the Damon Road southbound approach to the intersection see heavy traffic signal delay and often experience lengthy queues. The westbound Route 9 congestion at this location often extends over the Coolidge Bridge and into Hadley. This congestion overflow, combined with only one westbound travel lane on the Hadley side of the bridge intensifies the congestion.

Bay Road (Hadley) – The westbound segment of Bay Road from West Street to Route 9 is frequently congested. The westbound congestion on Route 9 results in drivers using Bay Road in an attempt to divert away from the Route 9 congestion. This results in high traffic volumes placed on the intersection of Route 9 and Bay Road.

Damon Road (Northampton) – Heavy traffic volumes from downtown Northampton, I-91, and Northampton converge at the intersection of Damon Road, Bridge Road, King Street, and North King Street causing significant traffic congestion. In addition, the southbound Damon Road approach to Route 9 often experiences vehicle queuing back to the King Street intersection.

Route 10 (Northampton) – The main congestion point along this segment of Route 10 is the northbound approach to Route 9 (Main Street). The congestion is the result of traffic signal operations and heavy volume. The queue extending along this approach often hinders the Route 10 southbound turning movement onto Old South Street.

Route 9 (Northampton) – Between Hawley Street and Market Street, Route 9 experiences congestion in both directions. This congestion, typical of that found in downtown areas, is a result of heavy traffic volumes, a large number of crossing pedestrians, and on street parking along both sides of the roadway.

In the Florence area of Northampton, congestion occurs along Route 9 between Chestnut Street and North Maple Street. Similar to the downtown congestion (although less severe), this congestion is likely the result of the proximity between the two signalized intersections, the on-street parking, and pedestrian crossings.

2.5.5 Summary

The following study area intersections were shown to experience operational deficiencies during one or both peak periods:

- Route 10 at Route 141 (Easthampton)
- Route 9 at Damon Road/I-91 northbound off-ramp (Exit 19, Northampton)
- Damon Road/Bridge Road at North King Street (Route 5/10, Northampton)
- Route 9 at Bay Road (Hadley)
- Route 9 at Route 47 (Hadley)
- Route 9 at Route 116 (Hadley)
- Route 9 at Route 116 (Amherst)
- I-91 southbound ramps (exit 18) at Route 5 (Northampton)
- Elm Street at Route 5/10 (Northampton)
- Route 116 at Route 47 (South Hadley)

Although not study area intersections, Route 9/Cross Path Road and Route 9/Aqua Vitae Road in Hadley just east of the Coolidge Bridge have been considered because they influences traffic flow on Route 9. Current plans by MassHighway will address these two intersections.

2.6 Study Area Trip Patterns

To gain an understanding of the trip patterns and trip characteristics through the study area, origin-destination (O-D) surveys were conducted in April 2002. The overall goal of the O-D surveys was to quantify the desired travel paths for east-west traffic on the Coolidge and Sunderland Bridges. The desired travel patterns will help guide the process of identifying and recommending alternatives. Because traffic conditions in the study area are strongly influenced by school-related traffic, the O-D surveys were conducted while all colleges, high schools, and elementary schools in the study area were on a regular schedule.

2.6.1 Method

Surveys were conducted near the Coolidge and Sunderland Bridges and distributed to drivers crossing each bridge in either direction. The Sunderland Bridge survey was conducted at the intersection of Route 116 and Route 47. The Coolidge Bridge survey was conducted at three locations - Route 9 and Bay Road; Route 9 and Cross Path Road; and along the Bay Road Connector. These locations were chosen because of their proximity to the bridges.

The O-D survey involved distributing mail-back type postcards to motorists that asked specific questions about the driver’s trip. Surveys were also given to some pedestrians and bicyclists. The survey asked for the following trip information:

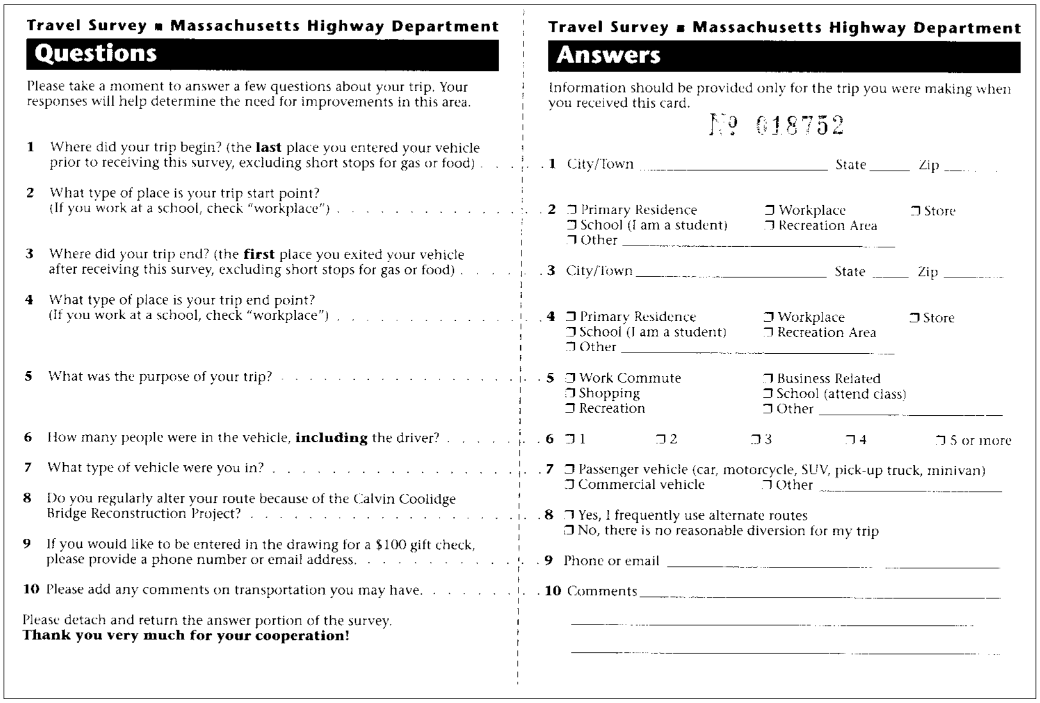
- trip origin and destination location;
- the origin/destination type (e.g. home, work, school, etc.);
- trip purpose (e.g. work commute, school, shopping);
- vehicle occupancy;
- vehicle type; and
- whether the driver frequently uses alternate routes.

Figure 2-15 depicts the survey instrument. Each postcard was sequentially numbered to identify the approximate time that the postcard was distributed.

The OD survey method involved sampling as many stopped vehicles as possible without compromising safety or causing undue delay or disruption to traffic flow. Surveys were only given to drivers who were already stopped. This distribution method minimized added delays caused by the survey effort.

The surveys were conducted from 7:00 AM to 7:00 PM to capture the bulk of the traffic crossing the two bridges. For safety purposes, these times were chosen to ensure adequate ambient lighting conditions at the start and end of the survey.

Figure 2-15
Origin-Destination Survey Instrument



Travel Survey ■ Massachusetts Highway Department **Questions**	**Travel Survey ■ Massachusetts Highway Department** **Answers**
Please take a moment to answer a few questions about your trip. Your responses will help determine the need for improvements in this area.	Information should be provided only for the trip you were making when you received this card. № 018752
1 Where did your trip begin? (the **last** place you entered your vehicle prior to receiving this survey, excluding short stops for gas or food)	**1** City/Town ______ State ______ Zip ______
2 What type of place is your trip start point? (If you work at a school, check "workplace")	**2** ☐ Primary Residence ☐ Workplace ☐ Store ☐ School (I am a student) ☐ Recreation Area ☐ Other ______
3 Where did your trip end? (the **first** place you exited your vehicle after receiving this survey, excluding short stops for gas or food)	**3** City/Town ______ State ______ Zip ______
4 What type of place is your trip end point? (If you work at a school, check "workplace")	**4** ☐ Primary Residence ☐ Workplace ☐ Store ☐ School (I am a student) ☐ Recreation Area ☐ Other ______
5 What was the purpose of your trip?	**5** ☐ Work Commute ☐ Business Related ☐ Shopping ☐ School (attend class) ☐ Recreation ☐ Other ______
6 How many people were in the vehicle, **including** the driver?	**6** ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more
7 What type of vehicle were you in?	**7** ☐ Passenger vehicle (car, motorcycle, SUV, pick-up truck, minivan) ☐ Commercial vehicle ☐ Other ______
8 Do you regularly alter your route because of the Calvin Coolidge Bridge Reconstruction Project?	**8** ☐ Yes, I frequently use alternate routes ☐ No, there is no reasonable diversion for my trip
9 If you would like to be entered in the drawing for a $100 gift check, please provide a phone number or email address.	**9** Phone or email ______
10 Please add any comments on transportation you may have.	**10** Comments ______
Please detach and return the answer portion of the survey. **Thank you very much for your cooperation!**	

To determine the sampling rate and assist in data factoring, daily traffic volumes were collected by MassHighway. MassHighway staff placed automated traffic recorder tubes (ATRs) across the roadway surface surrounding the OD survey sites to record traffic volumes. In doing so, the sample results could be expanded by location and by time of day (because the surveys were numbered) to reflect actual traffic volumes from 7:00 AM to 7:00 PM.

2.6.2 Survey Response Rate

A total of approximately 15,319 surveys were distributed – 10,931 in Hadley and 4,388 in Sunderland. During the processing of the returned surveys, those with incomplete state/town information or invalid origin-destination pairings were deemed unusable. A survey with an invalid origin-destination pair involved a trip that would not require passing the survey location (i.e., both origin and destination were located on one side of the Connecticut River). Surveys with round trip information provided rather than one-way trip information were corrected whenever possible. Invalid surveys were discarded from the analysis. Of the returned surveys, approximately 300 surveys were deemed unusable because of missing or invalid information. Table 2-8 summarizes the number of surveys distributed, the number of usable surveys returned, and return/sampling rates.

Table 2-9
O-D Survey Responses

Location	Number of Surveys Distributed	Number of Usable Surveys Returned[1]	Return Rate	Traffic Volume [2] (7:00 AM – 7:00 PM)	Sampling Rate
Hadley	10,931	3,281	30%	28,700	11%
Sunderland	4,388	1,347	31%	15,100	9%
Total	15,319	4,628	30%	43,800	11%

[1] Does not include 300 unusable survey responses.

[2] Traffic volume, expressed in number of vehicles.

In Hadley, 3,281 usable surveys were returned – a return rate of 30 percent. From 7:00 AM to 7:00 PM, there were 28,700 vehicles crossing the Route 9 bridge. The overall sampling rate for the Hadley survey was 11 percent. Congestion at the intersection of Route 9 and Bay Road resulted in ample opportunities to hand surveys to stopped vehicles (especially on Bay Road and Route 9 westbound).

In Sunderland, 1,347 usable surveys were returned – a return rate of 31 percent. From 7:00 AM to 7:00 PM, there were 15,100 vehicles crossing the Route 116 bridge, resulting in a sampling rate of 9 percent. The number of surveys distributed in Sunderland was lower than Hadley because of lower traffic volumes and less occurrences of stopped vehicles to survey. In addition, the traffic signal at the intersection of Route 116 and Route 47 was recently upgraded to a fully actuated operation to minimize stopped delays.

Overall, the number of returned surveys totaled 4,628 representing a return rate of 30 percent. Given the traffic volumes crossing both bridges from 7:00 AM to 7:00 PM, the overall sampling rate was 11 percent. Figures 2-16 and 2-17 depict the survey response rates on an hourly basis compared to the actual traffic volumes.

Figure 2-16
Route 9 River Crossing Origin-Destination Survey Responses - Hadley

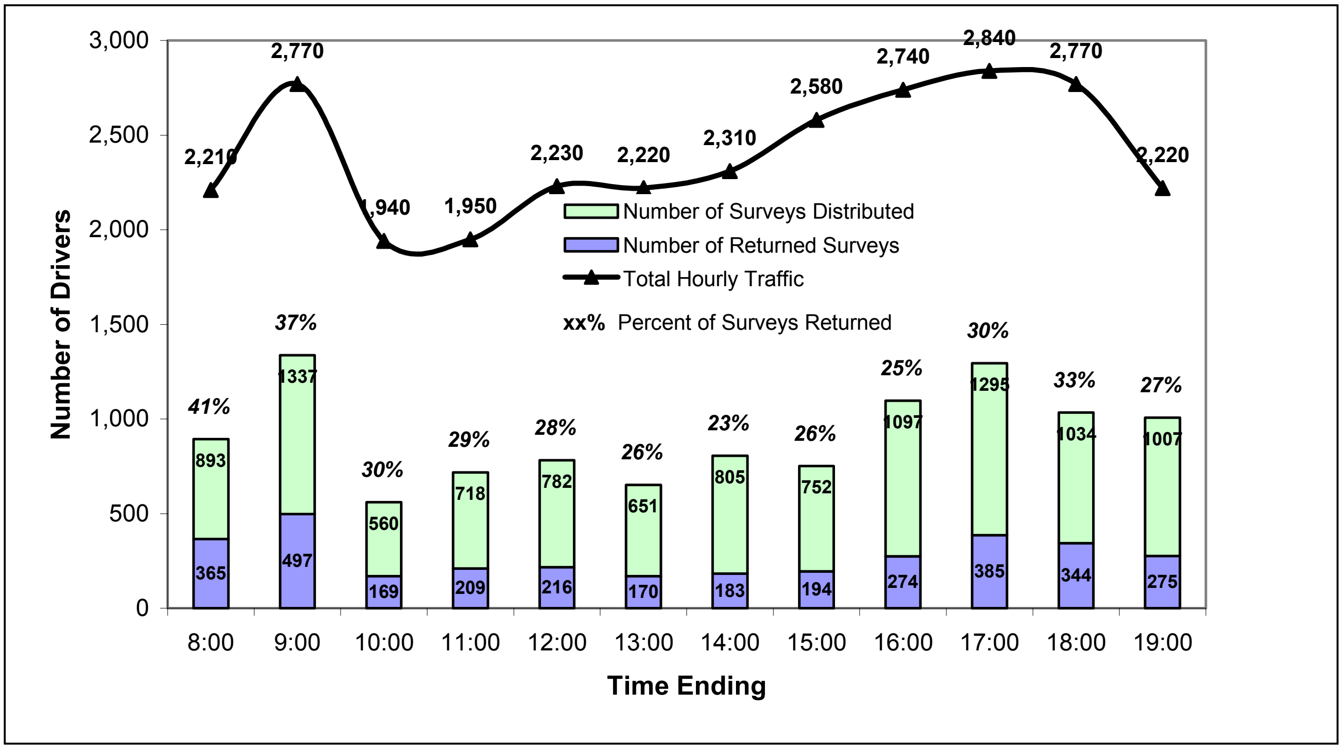
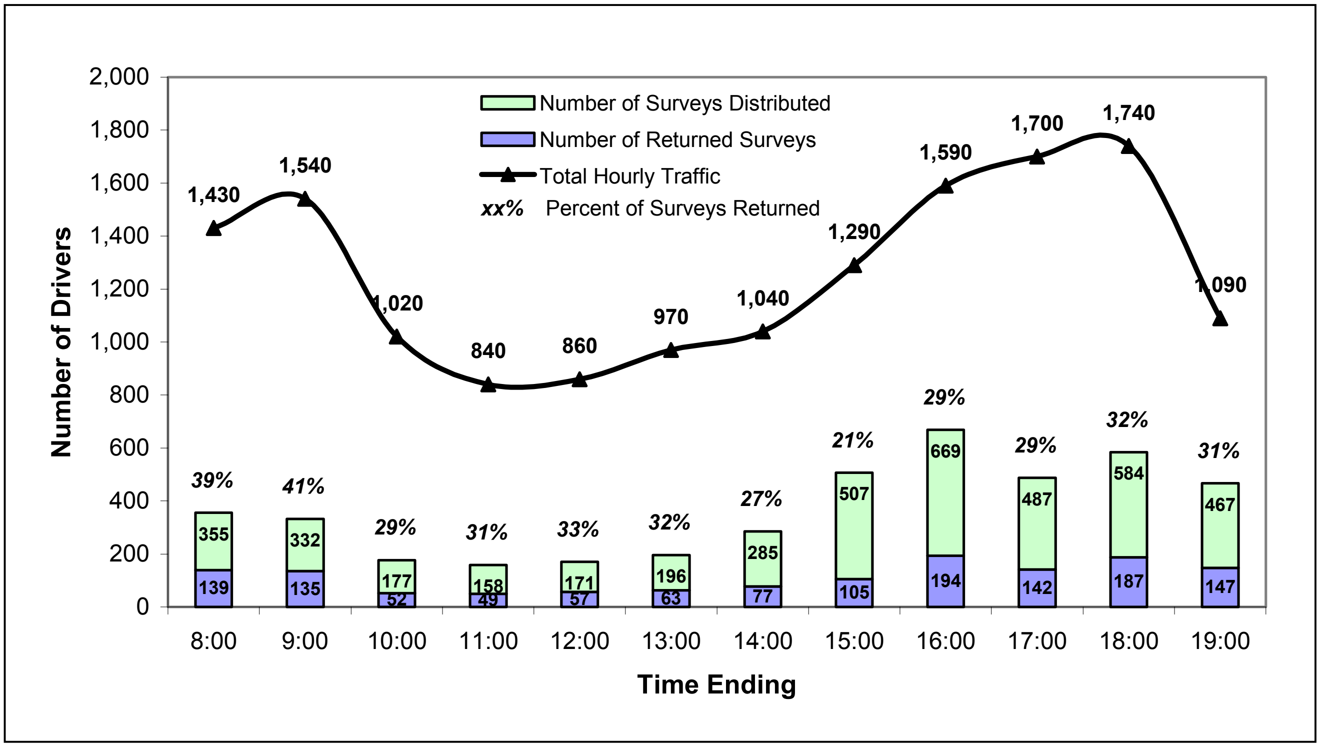


Figure 2-17
Route 116 River Crossing Origin-Destination Survey Responses - Sunderland



2.6.3 Expanding the Sample

To quantify the traffic volumes crossing the bridges, several automatic traffic recorder tubes (ATR) were placed across the roadway at each survey location by MassHighway. The purpose of counting the number of passing vehicles was to determine the appropriate factors to apply to the returned surveys. In doing so, the returned survey data can be expanded to reflect an estimate of all trip patterns from 7:00 AM to 7:00 PM.

For each survey location, expansion factors were determined for each direction (i.e. eastbound trips separate from westbound trips) and by time. Applying a separate expansion factor for each hour of the day would have skewed the results because there were intervals with low return rates, raising the potential for applying a larger expansion factor to a small sample size that may not be truly representative. Applying one expansion factor for the entire day would have skewed the survey data because trip patterns vary for peak and off-peak commute periods. To minimize any skew caused by expanding the survey sample, expansion factors were applied to the following three periods of the day:

- **Morning peak** – 7:00 AM to 9:00 AM
- **Off-peak** – 9:00 AM to 3:00 PM
- **Evening peak** – 3:00 PM to 7:00 PM

2.6.4 Survey Results

Tables 2-10 through 2-17 provide detailed survey responses for:

- vehicle occupancy
- trip purpose
- the tendency for drivers to use alternate routes, and
- major origin-destination trips patterns

Vehicle Occupancy

Motorists were asked to indicate how many persons (including the driver) were in the vehicle. For example, a response of “2” indicates one passenger along with the driver of the vehicle. Table 2-10 summarizes the responses for all day (7:00 AM to 7:00 PM) and for the morning peak, off-peak, and evening peak periods. Vehicle occupancy rates (VOR) are presented in the table.

Table 2-10
O-D Survey Responses - Vehicle Occupancy

Vehicle Occupancy	Coolidge Bridge		Sunderland Bridge	
	Number of Drivers	%	Number of Drivers	%
TOTAL SURVEY PERIOD (7:00 AM to 7:00 PM)				
1	21900	76%	11130	74%
2	4890	17%	2940	20%
3	1300	4%	810	5%
4	380	1%	100	1%
5+	340	1%	130	1%
VOR[1]		1.35		1.36
AM PEAK (7:00 AM to 9:00 AM)				
1	4080	82%	2450	83%
2	650	13%	340	11%
3	140	3%	110	4%
4	50	1%	20	1%
5+	70	1%	40	1%
VOR		1.28		1.27
OFF PEAK (9:00 AM to 3:00 PM)				
1	9980	75%	4050	67%
2	2430	18%	1530	25%
3	600	5%	340	6%
4	130	1%	40	1%
5+	100	1%	70	1%
VOR		1.33		1.43
PM PEAK (3:00 PM to 7:00 PM)				
1	7840	74%	4630	76%
2	1810	17%	1070	17%
3	560	5%	360	6%
4	200	2%	40	1%
5+	170	2%	20	0%
VOR		1.40		1.33

[1] VOR – Vehicle occupancy rate, expressed in average number of persons per vehicle.

The percent of single occupant vehicles (SOVs) crossing the Coolidge or Sunderland Bridges varies from 67 percent to 82 percent. During the morning peak hour, between 82 percent and 83 percent of the vehicles are SOVs on either crossing. During the evening peak hour, between 74 percent and 76 percent of the drivers were SOVs. For the midday, 75 percent of the drivers were SOVs on the Coolidge Bridge and 67 percent SOVs in Sunderland. The portion of SOVs is higher in the morning peak hour than any other time of the day because the morning peak is predominantly comprised of commuters with fewer retail/recreational trips than the midday or evening peak hour.

For the entire day, the vehicle occupancy rate (VOR) was similar for both crossings - 1.35 for the Coolidge Bridge and 1.36 for the Sunderland Bridge. The morning peak hour VOR was the lowest of the entire day (1.28 for the Coolidge Bridge and 1.27 for the Sunderland Bridge) because the morning is predominantly SOV work commuters.

The evening and midday VORs were 1.33 and 1.40 for the Coolidge Bridge and 1.43 and 1.33 for the Sunderland Bridge, respectively.

Trip Purpose

Motorists were asked to indicate the purpose of their trip. The survey provided the following categories for responses:

- Work commute (includes trips to a school if employed by the school)
- Business related
- Shopping
- School related (for trips by students to/from campus or parents picking-up/dropping-off)
- Recreational
- Other

Table 2-11 summarizes the responses.

For the overall survey period, the majority of trips are work commute trips – 46 percent on the Coolidge Bridge and 51 percent on the Sunderland Bridge. Shopping trips comprise 12 percent of the trips on the Coolidge Bridge and 10 percent on the Sunderland Bridge. Business-related work trips are 11 percent of the trips on the Coolidge Bridge and 8 percent on the Sunderland Bridge. School-related trips and recreational trips comprised less than 10 percent of the trips on either bridge.

In the morning peak period, there is a much higher percentage of work commute trips than any other period of the day – 73 percent on the Coolidge Bridge and 77 percent on the Sunderland Bridge. Shopping trips are the highest during the midday period. During the midday period, the work commute trips comprise a lower percentage than any other period of the day.

Alternate Routes

Motorists were asked whether they frequently alter their route because of construction traffic from the Coolidge Bridge project. Approximately 69 percent of drivers on the Coolidge Bridge do not regularly alter their commute to avoid construction traffic. Similarly, 70 percent of drivers on the Sunderland Bridge do not regularly alter their route. These high percentages are indicative of the fact that the limited number of bridge crossings in the study area restrict the use of alternate routes. The high percentages could also indicate that the construction-related congestion may not be high enough to encourage drivers to use circuitous alternate routes.

Table 2-11
O-D Survey Responses - Trip Purpose

Trip Purpose	Coolidge Bridge (% of Responses)	Sunderland Bridge (% of Responses)
TOTAL SURVEY PERIOD (7:00 AM TO 7:00 PM)		
Work Commute	46 %	51 %
Shopping	12 %	10 %
Business Related	11 %	8 %
School Related	6 %	9 %
Recreational	5 %	7 %
Other/No Response	20 %	15 %
AM PEAK (7:00 AM TO 9:00 AM)		
Work Commute	73 %	77 %
Shopping	3 %	2 %
Business Related	6 %	4 %
School Related	6 %	8 %
Recreational	1 %	1 %
Other/No Response	11 %	8 %
OFF PEAK (9:00 AM TO 3:00 PM)		
Work Commute	31 %	35 %
Shopping	17 %	16 %
Business Related	16 %	10 %
School Related	7 %	10 %
Recreational	5 %	9 %
Other/No Response	24 %	20 %
PM PEAK (3:00 PM TO 7:00 PM)		
Work Commute	51 %	55 %
Shopping	10 %	7 %
Business Related	8 %	8 %
School Related	6 %	8 %
Recreational	7 %	7 %
Other/No Response	18 %	15 %

Trip Origins

The O-D survey asked drivers to specify where they began their trip. Drivers responded with the city/town, state, and zip code of their trip origin. Tables 2-12 and 2-13 summarizes the responses.

Table 2-12
O-D Survey Responses - Coolidge Bridge Major Origins

Eastbound Trips			Westbound Trips		
	Trips	%		Trips	%
TOTAL (7:00 AM TO 7:00 PM)					
Northampton	6,800	48%	Amherst	7,500	51%
Easthampton	1,300	9%	Hadley	4,500	31%
Florence	1,000	7%	Belchertown	500	4%
Springfield	900	6%	South Hadley	500	4%
Holyoke	600	4%	Pelham	300	2%
AM PEAK (7:00 AM TO 9:00 AM)					
Northampton	900	38%	Amherst	900	35%
Easthampton	300	13%	Hadley	800	31%
Florence	300	13%	Belchertown	200	8%
Hatfield	100	4%	South Hadley	100	4%
Southampton	100	4%	Pelham	100	4%
OFF PEAK (9:00 AM TO 3:00 PM)					
Northampton	3,300	51%	Amherst	3500	51%
Easthampton	600	9%	Hadley	2200	32%
Florence	500	8%	South Hadley	200	3%
Springfield	300	5%	Belchertown	200	3%
Holyoke	200	3%	Pelham	200	3%
PM PEAK (3:00 PM TO 7:00 PM)					
Northampton	2,700	51%	Amherst	3100	58%
Springfield	500	9%	Hadley	1600	30%
Holyoke	300	6%	South Hadley	200	4%
Easthampton	300	6%	Belchertown	100	2%
Florence	200	4%	Pelham	100	2%

For eastbound trips on the Coolidge Bridge from 7:00 AM to 7:00 PM, approximately 6,800 trips began in Northampton, representing 48 percent of the total eastbound traffic on the Coolidge Bridge. Northampton is the most common trip origin for any time of the day.

For westbound trips, approximately 7,500 trips (51 percent) began in Amherst from 7:00 AM to 7:00 PM. Amherst and Hadley are the two most frequent trip origins for any time of the day.

Table 2-13
O-D Survey Responses - Sunderland Bridge Major Origins

Eastbound Trips			Westbound Trips		
	Trips	%		Trips	%
TOTAL (7:00 AM TO 7:00 PM)					
Deerfield/South Deerfield	2,300	31%	Amherst	3,300	43%
Greenfield	1,400	19%	Sunderland	2,000	26%
Northampton	700	10%	Hadley	800	10%
			Leverett	400	5%
Conway	400	6%	Montague	300	4%
AM PEAK (7:00 AM TO 9:00 AM)					
Deerfield/South Deerfield	500	32%	Sunderland	500	36%
Greenfield	300	19%	Amherst	400	29%
Conway	200	13%	Montague	100	7%
			Leverett	100	7%
Whately	100	6%	Hadley	100	7%
OFF PEAK (9:00 AM TO 3:00 PM)					
Deerfield/South Deerfield	1,100	37%	Amherst	1200	40%
Greenfield	600	20%	Sunderland	800	27%
Northampton	300	10%	Hadley	300	10%
			Leverett	200	7%
Whately	200	7%	Belchertown	100	3%
PM PEAK (3:00 PM TO 7:00 PM)					
Deerfield/South Deerfield	900	32%	Amherst	1800	55%
Greenfield	600	21%	Sunderland	700	21%
Northampton	400	14%	Hadley	400	12%
			Leverett	100	3%
Hatfield	100	4%	Montague	100	3%

For eastbound trips on the Sunderland Bridge from 7:00 AM to 7:00 PM, approximately 2,300 trips began in Deerfield/South Deerfield and 1,400 trips began in Greenfield, representing 31 percent and 19 percent of the total eastbound traffic on the Sunderland Bridge, respectively. South Deerfield and Deerfield were the two most common trip origins for any time of the day.

For westbound trips, approximately 3,300 trips (43 percent) began in Amherst and 2,000 trips (26 percent) began in Sunderland from 7:00 AM to 7:00 PM. By time-of-day, Amherst and Sunderland were the two most common trip origins for westbound trips.

Trip Destinations

The O-D survey asked drivers to specify where they ended their trip. Drivers responded with the city/town, state, and zip code of their trip destination. Tables 2-14 and 2-15 summarizes the responses.

Table 2-14
O-D Survey Responses - Coolidge Bridge Major Destinations

Eastbound Trips			Westbound Trips		
	Trips	%		Trips	%
TOTAL (7:00 AM TO 7:00 PM)					
Amherst	7,200	51%	Northampton	7,500	52%
Hadley	4,700	33%	Florence	1,200	8%
South Hadley	700	5%	Easthampton	1,100	7%
Belchertown	500	3%	Springfield	900	6%
Pelham	200	1%	Holyoke	600	4%
AM PEAK (7:00 AM TO 9:00 AM)					
Amherst	1400	58%	Northampton	1300	50%
Hadley	700	29%	Springfield	400	15%
South Hadley	100	4%	Easthampton	200	8%
Ware	100	4%	Holyoke	100	4%
Sunderland	100	4%	Florence	100	4%
OFF PEAK (9:00 AM TO 3:00 PM)					
Amherst	3100	48%	Northampton	3800	56%
Hadley	2400	37%	Florence	400	6%
South Hadley	300	5%	Easthampton	400	6%
Belchertown	200	3%	Springfield	300	4%
Leverett	100	2%	Holyoke	300	4%
PM PEAK (3:00 PM TO 7:00 PM)					
Amherst	2600	49%	Northampton	2500	47%
Hadley	1600	30%	Florence	600	11%
Belchertown	300	6%	Easthampton	500	9%
South Hadley	200	4%	Springfield	200	4%
Pelham	100	2%	Southampton	200	4%

For eastbound trips on the Coolidge Bridge, approximately 7,200 trips were destined for Amherst, representing 51 percent of the traffic on the Coolidge Bridge from 7:00 AM to 7:00 PM. The eastbound trip patterns were similar by time-of-day, where the most frequent destinations are consistently Amherst and Hadley.

For westbound trips, approximately 7,500 trips (52 percent) were destined for Northampton. Northampton was the most frequent trip destination for all times of the day.

Table 2-15
O-D Survey Responses - Sunderland Bridge Major Destinations

Eastbound Trips			Westbound Trips		
	Trips	%		Trips	%
TOTAL (7:00 AM TO 7:00 PM)					
Amherst	3,300	44%	Greenfield	1,600	21%
Sunderland	1,700	23%	South Deerfield	1,400	19%
Hadley	1,000	13%	Northampton	900	12%
Montague	400	5%	Deerfield	700	9%
Leverett	200	2%	Whately	400	6%
AM PEAK (7:00 AM TO 9:00 AM)					
Amherst	1,100	69%	Greenfield	300	21%
Sunderland	100	6%	Northampton	300	21%
Hadley	100	6%	South Deerfield	200	14%
North Amherst	100	6%	Deerfield	100	7%
Montague	100	6%	Springfield	100	7%
OFF PEAK (9:00 AM TO 3:00 PM)					
Amherst	1,300	43%	Greenfield	700	23%
Sunderland	700	23%	South Deerfield	600	20%
Hadley	600	20%	Northampton	300	10%
Montague	200	7%	Deerfield	300	10%
Leverett	100	3%	Whately	100	3%
PM PEAK (3:00 PM TO 7:00 PM)					
Sunderland	900	32%	Greenfield	700	21%
Amherst	900	32%	South Deerfield	600	18%
Hadley	300	11%	Northampton	300	9%
Montague	200	7%	Deerfield	300	9%
Belchertown	100	4%	Whately	300	9%

For eastbound trips on the Sunderland Bridge, approximately 3,300 trips were destined for Amherst, representing 44 percent of the total traffic on the Sunderland Bridge from 7:00 AM to 7:00 PM. Amherst and Sunderland were the two most common trip destination for all times of the day.

For westbound trips, approximately 1,600 trips (21 percent) were destined for Greenfield and 1,400 trips (19 percent) were destined for South Deerfield. Greenfield was the most frequent trip destination for all periods of the day.

Trip Pairings

Trip patterns on the Coolidge and Sunderland bridges can be quantified by tabulating the trip pairs from the O-D survey. From the trip patterns, desired travel paths for east-west trips can be estimated. Tables 2-16 and 2-17 summarize the top

O-D pairings for the Coolidge and Sunderland Bridges. Figures 2-18 and 2-19 depict the major desired travel paths from the O-D surveys.

Table 2-16
O-D Survey Responses - Coolidge Bridge Major O-D Pairs

Origin-Destination Pairing		Trips	Percent
Northampton	Amherst	8,400	29%
Northampton	Hadley	4,700	16%
I-91 Points South	Amherst	3,400	12%
I-91 Points South	Hadley	1,700	6%
Northampton	Route 9 Points East	1,300	4%
Easthampton	Amherst	1,200	4%
Easthampton	Hadley	1,000	3%
Northampton	South Hadley	800	3%

Trips – The number of vehicle trips from 7:00 AM to 7:00 PM for both eastbound and westbound directions.
Percent – The percent of trips observed from 7:00 AM to 7:00 PM

From the Coolidge Bridge trip pairings (Table 2-16 and Figure 2-18), approximately 8,400 trips were between Northampton and Amherst, representing 29 percent of the total traffic on the bridge. Approximately 4,700 trips (16 percent) were between Northampton and Hadley.

Table 2-17
Sunderland Bridge Major Origin-Destination Pairs

Origin-Destination Pairing		Trips	Percent
I-91 Points North	Amherst	4,300	29%
I-91 Points North	Sunderland	2,000	13%
I-91 Points North	Hadley	1,300	9%
Northampton	Sunderland	700	4%
I-91 Points North	Route 9 Points East	500	3%
Conway	Amherst	400	3%
Whately	Amherst	400	3%
Northampton	Amherst	400	2%

Trips – The number of vehicle trips from 7:00 AM to 7:00 PM for both eastbound and westbound directions.
Percent – The percent of trips observed from 7:00 AM to 7:00 PM

From the Sunderland Bridge trip pairings (Table 2-17 and Figure 2-19), approximately 4,300 trips were between I-91 (points north) and Amherst, representing 29 percent of the total traffic on the bridge. Approximately 2,000 trips (13 percent) were between I-91 (points north) and Sunderland.

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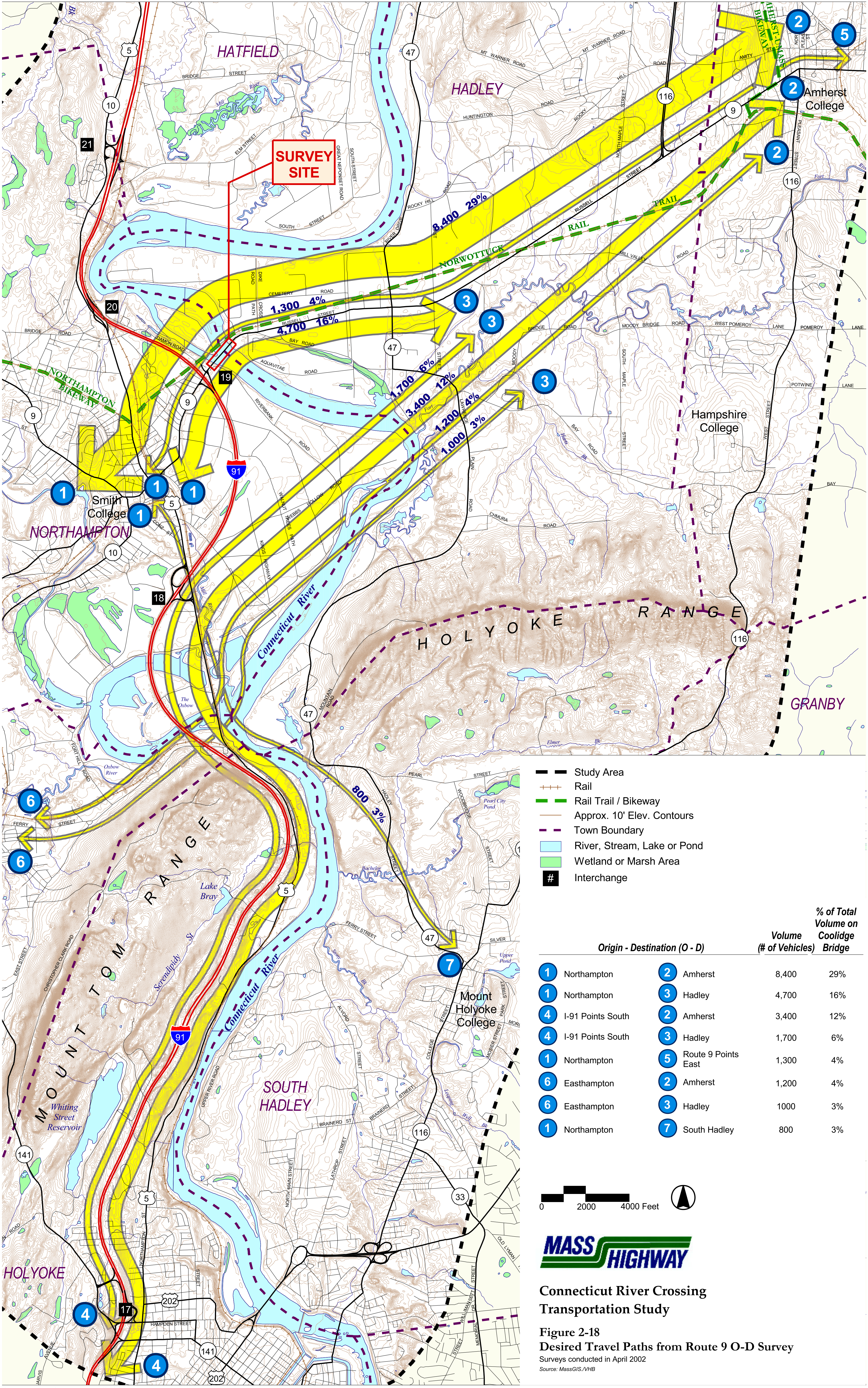

Study Area
Rail
Rail Trail / Bikeway
Approx. 10' Elev. Contours
Town Boundary
River, Stream, Lake or Pond
Wetland or Marsh Area
Interchange

Origin - Destination (O - D)		Volume (# of Vehicles)	% of Total Volume on Coolidge Bridge
① Northampton	② Amherst	8,400	29%
① Northampton	③ Hadley	4,700	16%
④ I-91 Points South	② Amherst	3,400	12%
④ I-91 Points South	③ Hadley	1,700	6%
① Northampton	⑤ Route 9 Points East	1,300	4%
⑥ Easthampton	② Amherst	1,200	4%
⑥ Easthampton	③ Hadley	1000	3%
① Northampton	⑦ South Hadley	800	3%

0 2000 4000 Feet

MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 2-18
Desired Travel Paths from Route 9 O-D Survey
Surveys conducted in April 2002
Source: MassGIS./VHB

Source: April 2002 Origin-Destination (O-D) Survey.
Note: O-D Pairs with Volumes below 2 Percent are not shown.

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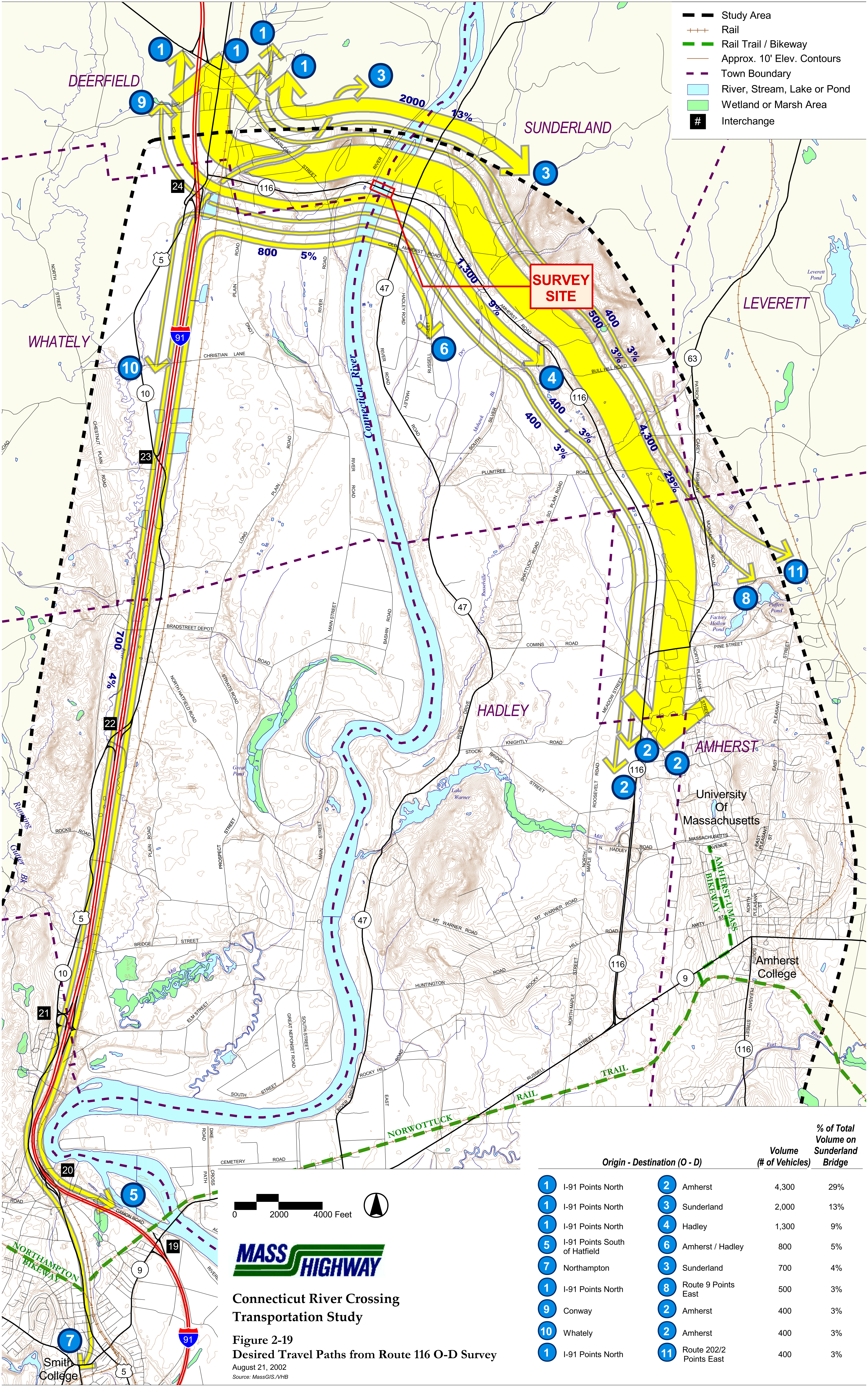

Origin - Destination (O - D)				Volume (# of Vehicles)	% of Total Volume on Sunderland Bridge
1	I-91 Points North	2	Amherst	4,300	29%
1	I-91 Points North	3	Sunderland	2,000	13%
1	I-91 Points North	4	Hadley	1,300	9%
5	I-91 Points South of Hatfield	6	Amherst / Hadley	800	5%
7	Northampton	3	Sunderland	700	4%
1	I-91 Points North	8	Route 9 Points East	500	3%
9	Conway	2	Amherst	400	3%
10	Whately	2	Amherst	400	3%
1	I-91 Points North	11	Route 202/2 Points East	400	3%

MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 2-19
Desired Travel Paths from Route 116 O-D Survey
August 21, 2002
Source: MassGIS./VHB

Source: April 2002 Origin-Destination (O-D) Survey.
Note: O-D Pairs with Volumes below 3 Percent are not shown.

Summary of the O-D Survey

The origin-destination survey involved distributing mail-back surveys to motorists crossing the Coolidge Bridge and the Sunderland Bridge. Comparing the usable surveys that were returned to the traffic volume on these two bridges, the sampling rate was 11 percent on the Coolidge Bridge and 9 percent on the Sunderland Bridge. In addition to origin-destination trip information, the survey asked for vehicle occupancy, trip purpose, and the use of alternate routes. The responses were:

- **Vehicle Occupancy –**During the morning peak hour, approximately 82 percent of the vehicles are single occupant vehicles (SOVs) on either crossing. During the evening peak hour, between 74 and 76 percent of the drivers were SOVs. For the entire day, 76 percent of the drivers were SOVs on the Coolidge Bridge and 74 percent SOVs in Sunderland. For the entire day, the vehicle occupancy rate (VOR) was similar for both crossings - 1.35 for the Coolidge Bridge and 1.36 for the Sunderland Bridge (a VOR of 2.0 would indicate one passenger in the vehicle). The morning peak hour VOR was the lowest of the entire day (1.28 for the Coolidge Bridge and 1.27 for the Sunderland Bridge) because the morning is predominantly SOV work commuters. The evening and midday VORs were 1.33 and 1.40 for the Coolidge Bridge and 1.43 and 1.33 for the Sunderland Bridge, respectively.

- **Trip Purpose -** The majority of trips are work commute trips – 46 percent on the Coolidge Bridge and 51 percent on the Sunderland Bridge. Shopping trips comprise 12 percent of the trips on the Coolidge Bridge and 10 percent on the Sunderland Bridge. Business-related work trips are 11 percent of the trips on the Coolidge Bridge and 8 percent on the Sunderland Bridge. School-related trips and recreational trips comprised less than 10 percent of the trips on either bridge. In the morning peak period, there is a much higher percentage of work commute trips than any other period of the day – 73 percent on the Coolidge Bridge and 77 percent on the Sunderland Bridge. Shopping trips are the highest during the midday period. During the midday period, the work commute trips comprise a lower percentage than any other period of the day.

- **Alternate Routes -** Approximately 69 percent of drivers on the Coolidge Bridge do not regularly alter their commute to avoid construction traffic. Similarly, 70 percent of drivers on the Sunderland Bridge do not regularly alter their route.

- **Trip Origins –** For eastbound trips on the Coolidge Bridge, the top three origins were Northampton, Easthampton, and Florence. For westbound trips on the Coolidge Bridge, the top origins were Amherst, Hadley, and Belchertown. For eastbound trips on the Sunderland Bridge, South Deerfield, Greenfield, and Northampton were the top origins. For westbound trips on the Sunderland Bridge, the top origins were Amherst, Sunderland, and Hadley.

- **Trip Destinations -** For eastbound trips on the Coolidge Bridge, the top three destinations were Amherst, Hadley, and South Hadley. For westbound trips on the Coolidge Bridge, the top destinations were Northampton, Florence, and Easthampton. For eastbound trips on the Sunderland Bridge, Amherst, Sunderland, and Hadley were the top destinations. For westbound trips on the Sunderland Bridge, the top destinations were Greenfield, South Deerfield, and Northampton.

- **Trip Pairs –** The top three trip pairs on the Coolidge Bridge were Northampton-Amherst, Northampton-Hadley, and I-91 (points south)-Amherst. The top trip pairs on the Sunderland Bridge were I-91 (points north)-Amherst, I-91 (points north)-Sunderland, and I-91 (points north)-Hadley.

2.7 Transit and Bicycle Transportation

This section documents transit and bicycle transportation in the study area. Three public transit agencies and one intercity motor coach operator serve the study area. The largest public transit agency is the Pioneer Valley Transit Agency with an extensive network of service including hubs in Amherst, Northampton, and Holyoke. The other two public transit agencies are the Franklin Regional Transit Authority and the Greenfield-Montague Transportation Area, both of which operate out of Greenfield. Peter Pan Bus Lines operates regional and national motor coach service from Amherst through Springfield.

2.7.1 Public Transit Service

The Pioneer Valley Transit Agency (PVTA) is the predominant provider of public transit in the study area. The PVTA provides service to 24 cities and towns, including South Deerfield, Sunderland, Amherst, Hadley, Granby, South Hadley, Holyoke, Northampton and Easthampton. Whately and Hatfield are the only towns in the study area that are not served by the PVTA.

The PVTA operates 12 routes out of Amherst, with service coverage of all of Amherst, the Route 116 (north) corridor into Sunderland and South Deerfield Center, the Route 9 (east) corridor to Belchertown Center, and the Route 116 (south) corridor through Granby to South Hadley.

The PVTA operates seven routes from Northampton. Two cover the Route 9 corridor to Amherst and one serves Hampshire College in South Amherst. Other Northampton routes include an intracity route, and routes to the neighboring communities of Williamsburg, Easthampton, and Holyoke.

The PVTA operates seven routes from Holyoke. One route serves South Hadley and Granby. There are several Holyoke routes as well as routes to Chicopee and to Springfield.

The Franklin Regional Transit Authority (FRTA) provides regional service to Greenfield. The FRTA operates four routes; two along Route 2, one to Northfield, and the Valley Route between Greenfield and Northampton via South Deerfield.

The Greenfield Montague Transportation Area (GMTA) transit service operates several routes within Greenfield and Montague. The GMTA service includes a route between Greenfield and UMass via Turners Falls and Montague.

South Deerfield Area Routes

Public transit service that crosses the Route 116/Sunderland Bridge is limited to a single PVTA route. The GMTA and the FRTA also operate routes in the northern part of the study area but none of those routes cross the Route 116/Sunderland Bridge nor connect with the PVTA route. The PVTA operates six roundtrips each weekday between South Deerfield Center and UMass.

Northampton Area Routes

The PVTA operates seven routes from Northampton, including three that cross the Connecticut River at Route 9. Two of the routes serve Hadley, Amherst and UMass. The other route serves Hampshire College and Mount Holyoke College. There are approximately 100 bus trips in each direction over the Coolidge Bridge during a typical weekday.

South Hadley Area Routes

The PVTA operates seven routes in Holyoke, one of which crosses the Connecticut River into South Hadley and Granby. The R25 bus route provides service between downtown Holyoke and South Hadley and Granby. The bus route crosses the Connecticut River on Route 116, just south of the Route 202/Mueller Bridge.

2.7.2 Intercity Motor Coach Service

Peter Pan Bus Lines (PPBL) provides scheduled intercity bus service from Northampton, Greenfield, Amherst and South Hadley to Springfield. Regional and national connections are provided from Springfield to PPBL's primary markets of Boston, Worcester, Hartford, New Haven, Albany, New York City, Philadelphia, Baltimore and Washington.

There are nine daily roundtrips (eight on Saturday) between Springfield and Amherst. Six of the daily roundtrips travel via downtown Northampton. These buses travel between Northampton and Amherst on Route 9 and over the Coolidge Bridge. Three of the daily roundtrips travel via South Hadley and Holyoke on Route

116 and Route 202 over the Route 202/Mueller Bridge. Service to Greenfield consists of one trip to Amherst in the morning and one trip to Greenfield in the evening. The Greenfield Route is along Route 116 and crosses the Connecticut River at the Route 116/Sunderland Bridge.

2.7.3 Bicycle Transportation

The study area has five designated on-road or off-road bicycle facilities. They are:

- **The Norwottuck Rail Trail –** an 8.5 mile rail-trail linking Northampton, Hadley, and Amherst. This rail trail has recently been extended north of Route 9 to connect to the UMass campus (the UMass Connector).
- **The Regional Bikeway Network –** an 8 mile on-road bikeway along Route 5 from Northampton to Holyoke.
- **The Five College Bikeway –** a 6 mile on-road bikeway between Amherst and Hadley.
- **The Northampton Bikeway –** a 2.5 mile multi-use rail-trail in Northampton.
- **The Manhan Rail Trail -** a 4.2 mile multi-use recreational path between South Street in Easthampton and Mount Tom junction. The path has an existing connection to Northampton and a planned connection to the Norwottuck Rail Trail.

In addition to the five current bicycle facilities, the Franklin County Bikeway is in various stages of planning and design. This bikeway consists of 46 miles of off-road bike paths and shared roadway facilities. Phase I, a 4-mile off-road bike path through Greenfield and Montague, is currently under design review.

According to 1990 census data, on a national basis bicycling accounts for less than one percent of all trips. Amherst, Northampton, Holyoke, and South Hadley are the study area communities with bicycle commuting rates higher than the national average. [2]

2.8 ITS

Concern over construction impacts at the Coolidge Bridge has prompted the state to develop an Advanced Traffic Management System (ATMS). This system, the Regional Traffic Operations Center (RTOC), is located at MassHighway's District 2 headquarters and the Massachusetts State Police barracks in Northampton. The information gathered at this station is provided to the public via portable message signs currently located along Route 9, I-91, and other key highways. It is assumed that the equipment currently being used for the bridge reconstruction will be integrated into an overall I-91 ATMS system once construction is complete.

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[2] The Pioneer Valley Regional Bicycle and Pedestrian Transportation Plan; September 2000.

In addition, MassHighway and the University of Massachusetts (UMass) have teamed to establish and operate a Regional Transportation Information Center (RTIC) on the University's Amherst Campus. The center collects and disseminates traffic, transit, and transit information for public use including:

- Traffic conditions and information regarding Coolidge Bridge construction mitigation;
- Travel time and congestion information for the Route 9 and Route 116 corridors;
- Transit information;
- On-campus (UMass) parking conditions; and
- Traffic and transit conditions as reported by the Route 2 Corridor travel and Information service.

The most comprehensive of these services is the Coolidge Bridge construction website set up by the Civil Engineering Department of UMass. This website (www.umass.edu/coolidgeinfo) is also connected to several other local community websites including those maintained by MassHighway, PVPC and FRCOG.

A complete discussion of the regional strategic plan for ITS deployment in the Pioneer Valley can be found in Chapter 6. This discussion includes the current MassHighway initiatives along I-91 and throughout Metropolitan Springfield, the current deployment plans of the Pioneer Valley Transit Authority (PVTA), and the future plans for RTIC services.

2.9 TDM/TSM

Transportation Demand Management (TDM) and Transportation Systems Management (TSM) programs are currently being developed within the study area. UMass Parking Services and UMass Transit Services have begun a TDM/ridesharing program as part of the University's services to the Amherst/UMass community. The UMass TDM coordinator was also in charge of a successful Route 9 Transportation Management Association (TMA) from 1999-2002. Federal funding for this program ended in 2002 and a new funding source has yet to be identified.

In addition, the FRCOG is in the process of accepting TDM project proposals for screening and prioritizing by the regional planning agency in which the town or agency is located. Proposals prioritized by the Franklin Regional Planning Board will be forwarded to the Executive Office of Transportation and Construction for consideration in Massachusetts TDM grant process. The TDM Grant Program provides funding for transportation-related projects that help improve air quality. The goal of the program is to encourage the use of alternatives to driving alone by supporting strategies that encourage the use of alternative modes of transportation such as the use of public transit, bicycling and walking.

2.10 Summary of Existing Transportation Conditions

The following broad conclusions can be made from the detailed data provided in this chapter:

Demographics – The major activity nodes are the communities with the highest population and traffic generation. For the study area, Holyoke, Amherst, Northampton, South Hadley, and Easthampton are the top activity nodes. The top employer for the entire Pioneer Valley Region is the University of Massachusetts in Amherst with 4,700 employees. The other top employers in the region are located to the south in Springfield and East Longmeadow. Within the bounds of the study area, the other top employers are Smith College in Northampton (1,130 employees) and Yankee Candle in Deerfield (1,040 employees). From 1990 to 2000, the communities of Whately, Hadley, and Sunderland saw the greatest percent increase in population. The highest loss of population on a percentage basis from 1990 to 2000 occurred in Holyoke and Deerfield.

Traffic Volumes - Of the three bridges in the study area, the Coolidge Bridge carries the majority of the east-west traffic over the Connecticut River, approximately 34,900 vehicles per day (vpd). The Sunderland Bridge carries the least traffic of the three bridges in the study area, approximately 17,400 vpd. Weekday data show that traffic in the area is typically higher on Thursdays and Fridays than other days of the week. Friday is clearly the day of the week with the highest traffic volumes. When the area schools are not in session (before September), traffic in the area is somewhat lower than when school is in session.

Travel Times - For north-south travel, there are a few localized areas of delays on Routes 5, 116, and 47. In general, I-91 does not experience recurring peak hour congestion. For east-west travel, there are three key bottlenecks along Route 9 in the vicinity of the Coolidge Bridge. They are:

- the intersection of Route 9 and Damon Road/I-91 Interchange 19 off-ramp;
- the intersection of Route 9 and Bay Road; and
- the Coolidge Bridge.

Safety – There are numerous intersections in the study area with safety issues based on a review of accident data. The Route 9 corridor between Northampton and Amherst has the highest concentration of high crash locations compared to other highway links in the study area. The development of alternatives will focus on addressing these safety issues to the extent possible.

Traffic Operations – Figure 2-13 clearly depicts the locations in the study area where capacity is insufficient. For example, there are no apparent capacity constraints in the vicinity of the Sunderland Bridge, suggesting that the traffic volumes are handled by the current infrastructure. There are numerous capacity constraints and LOS deficiencies in the vicinity of the Coolidge Bridge, suggesting that the existing infrastructure cannot handle the existing traffic volumes and that some traffic diversions are occurring. The O-D survey confirms that there are some drivers who use a circuitous route via the Sunderland Bridge to bypass the Coolidge Bridge and Route 9 traffic.

Trip Origins – For eastbound trips on the Coolidge Bridge, the top three origins were Northampton, Easthampton, and Florence. For westbound trips on the Coolidge Bridge, the top origins were Amherst, Hadley, and Belchertown. For eastbound trips on the Sunderland Bridge, South Deerfield, Greenfield, and Northampton were the top origins. For westbound trips on the Sunderland Bridge, the top origins were Amherst, Sunderland, and Hadley.

Trip Destinations – For eastbound trips on the Coolidge Bridge, the top three destinations were Amherst, Hadley, and South Hadley. For westbound trips on the Coolidge Bridge, the top destinations were Northampton, Florence, and Easthampton. For eastbound trips on the Sunderland Bridge, Amherst, Sunderland, and Hadley were the top destinations. For westbound trips on the Sunderland Bridge, the top destinations were Greenfield, South Deerfield, and Northampton.

Trip Pairs – The top three trip pairs on the Coolidge Bridge were Northampton-Amherst, Northampton-Hadley, and I-91 (points south)-Amherst. The top trip pairs on the Sunderland Bridge were I-91 (points north)-Amherst, I-91 (points north)-Sunderland, and I-91 (points north)-Hadley.

Transit/Bicycle – There are approximately 100 bus trips in each direction over the Coolidge Bridge during a typical weekday. On the Sunderland Bridge, there are approximately 6 bus trips in each direction during a typical weekday. Amherst, Northampton, Holyoke, and South Hadley are the study area communities with bicycle commuting rates higher than the national average.

3.0 Existing Environmental Conditions

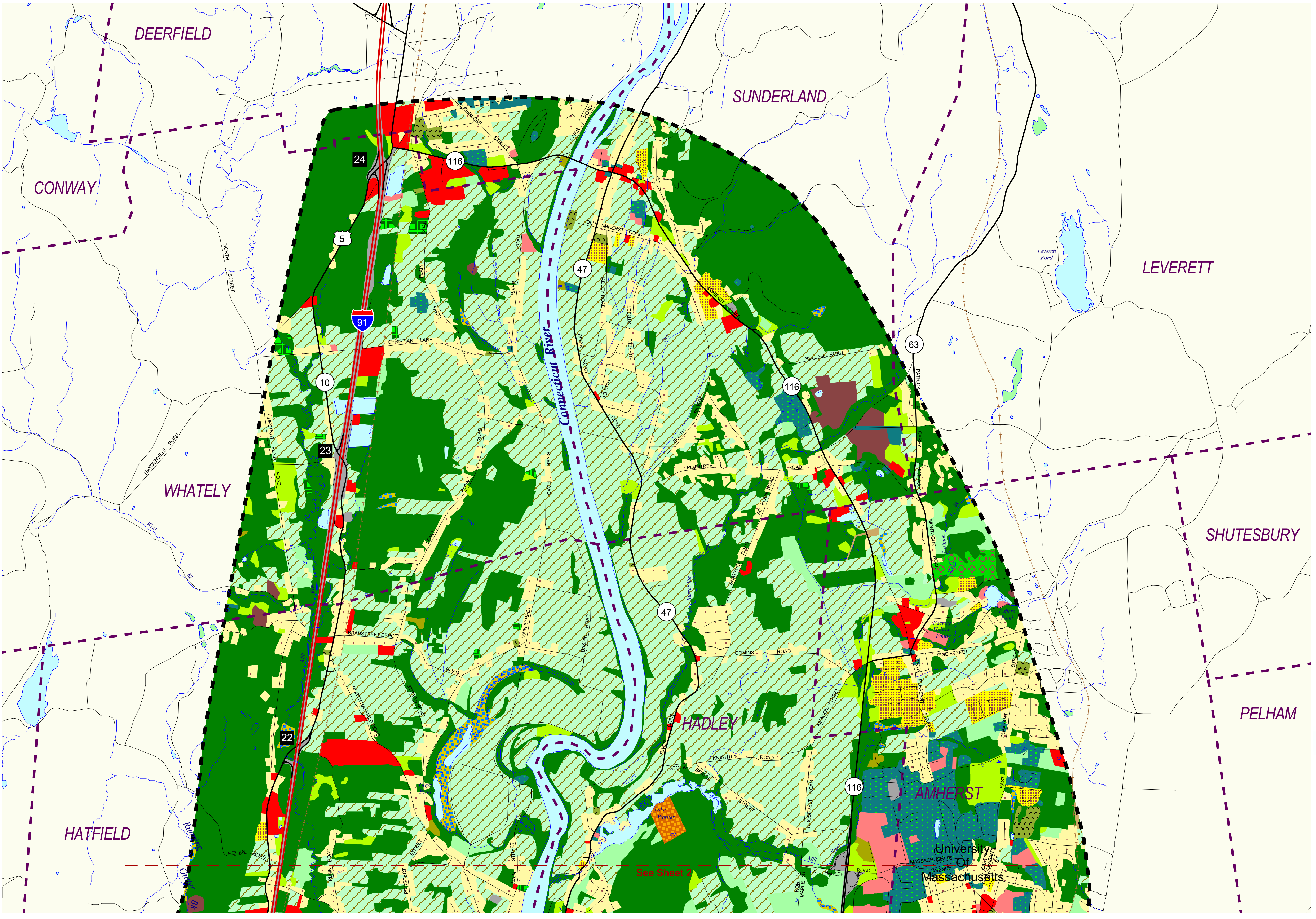
This chapter documents the existing environmental conditions within the study area. Base mapping procedures, land uses, and the environmental resources are discussed in detail. The land use and environmental constraints discussed in this chapter will help guide the development of alternatives so that impacts to the environment are avoided, minimized, or appropriately mitigated. Within this chapter, several environmental constraint maps have been developed.

3.1 Base Mapping

The study area considered for this environmental evaluation is approximately 18 miles long from north to south, and 8 miles wide from east to west. Base mapping for the study area was developed primarily through downloading data layers from the Massachusetts Geographic Information System (MassGIS) website (http://www.state.ma.us/mgis/massgis.htm). The MassGIS coverage for the study area is comprised of data layers from 1997 to 2002. In addition to using MassGIS as a resource, additional information on historic and archaeological data was obtained directly from the Massachusetts Historical Commission and information for hazardous material sites was obtained from New England Data Map Corporation's FirstSearch DataBase.

3.2 Land Use

Land use patterns within the study area, while not directly regulated by federal or state environmental regulations, are important factors to consider during the review of transportation improvements. Potential impacts to sensitive land areas can affect the feasibility of the various alternatives considered. Transportation improvements can also influence the growth of residential communities and industrial business, as well as forestry, agricultural practices, and recreation activities. Figure 3-1 depicts the land uses throughout the study area.



MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 3-1
Land Use

(Sheet 1 of 3)

Source: MassGIS. 1999 Land Use

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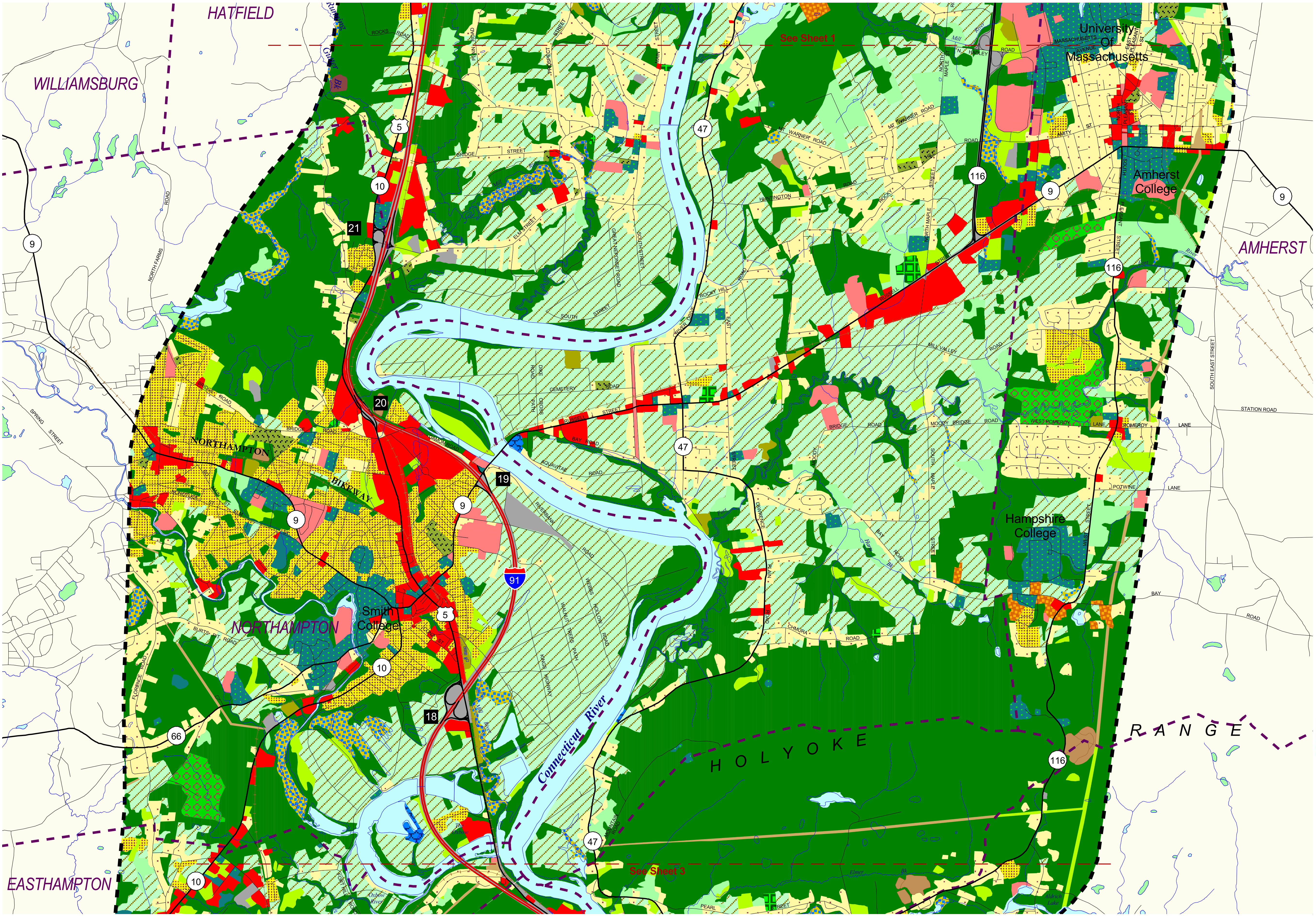

MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 3-1
Land Use

(Sheet 2 of 3)

Source: MassGIS. 1999 Land Use

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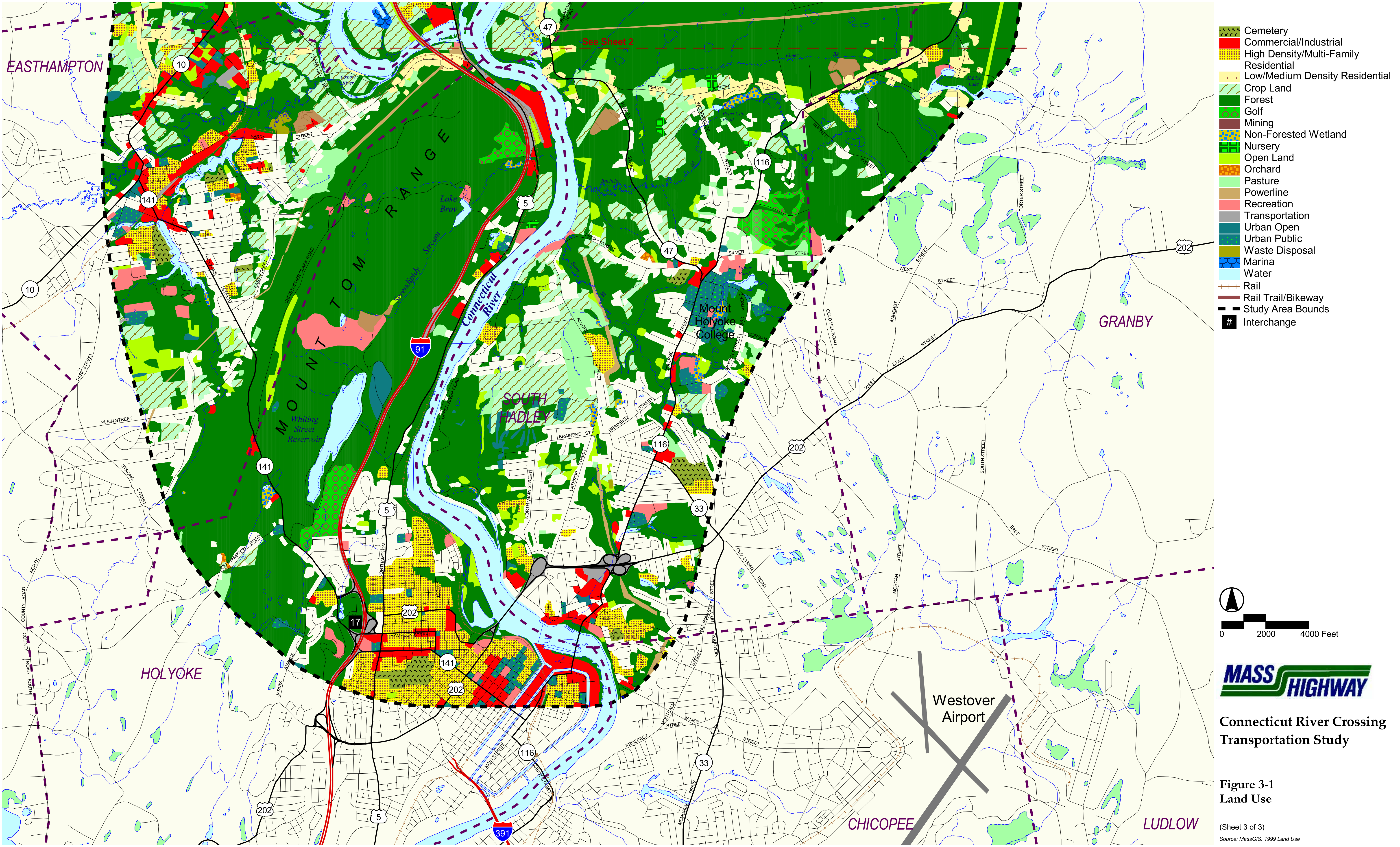

Connecticut River Crossing Transportation Study

Figure 3-1
Land Use

(Sheet 3 of 3)

Source: MassGIS. 1999 Land Use

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The study area is primarily rural, with five pockets of urbanization. The area is also known as the Five-College Area, and the urbanized areas generally coincide with the five colleges (University of Massachusetts - Amherst, Amherst College, Hampshire College, Smith College, and Mount Holyoke College). Commercial and industrial development is concentrated along major roadways such as Route 9 in Hadley/Amherst, Route 5 in Northampton, and, to a lesser extent, Route 10 in Easthampton.

Elevations within the study area range from approximately 40 feet at the valley floor to 1,200 feet at Mount Tom. The Connecticut River Valley in the northern and central portion of the study area contains rich, fertile soils that are used extensively for agriculture. Further south, the Connecticut River flows thorough a narrow valley between the Mount Tom and Mount Holyoke mountain ranges, and land use in this area is primarily forested.

3.3 Environmental Resources

Environmental resources in the study area were investigated to provide a framework for developing and evaluating potential transportation improvements. This chapter describes the environmental resources in the study area that were mapped.

3.3.1 Wetlands and Floodplains

Wetlands and floodplains are protected by state and federal laws and Executive Orders 11990 (wetlands protection), and 11988 (floodplain management). These resources are protected because of the important functions that they provide and will require substantial attention during the alternatives evaluation phase of the study. Figure 3-2 depicts the locations of the study area wetlands.

Wetland Classifications

Wetlands in the study area were identified using National Wetland Inventory (NWI) maps and United States Geological Survey (USGS) maps. NWI polygon data and USGS data were downloaded from the MassGIS website. No field delineation of wetland boundaries was undertaken during this phase of the study[3].

The NWI maps use the Cowardin Classification System to classify wetlands by "systems" according to plants, soils, and frequency of flooding. The systems are then further subdivided into subsystems, classes, and subclasses based on substrate material, flooding regime, and vegetative life form.

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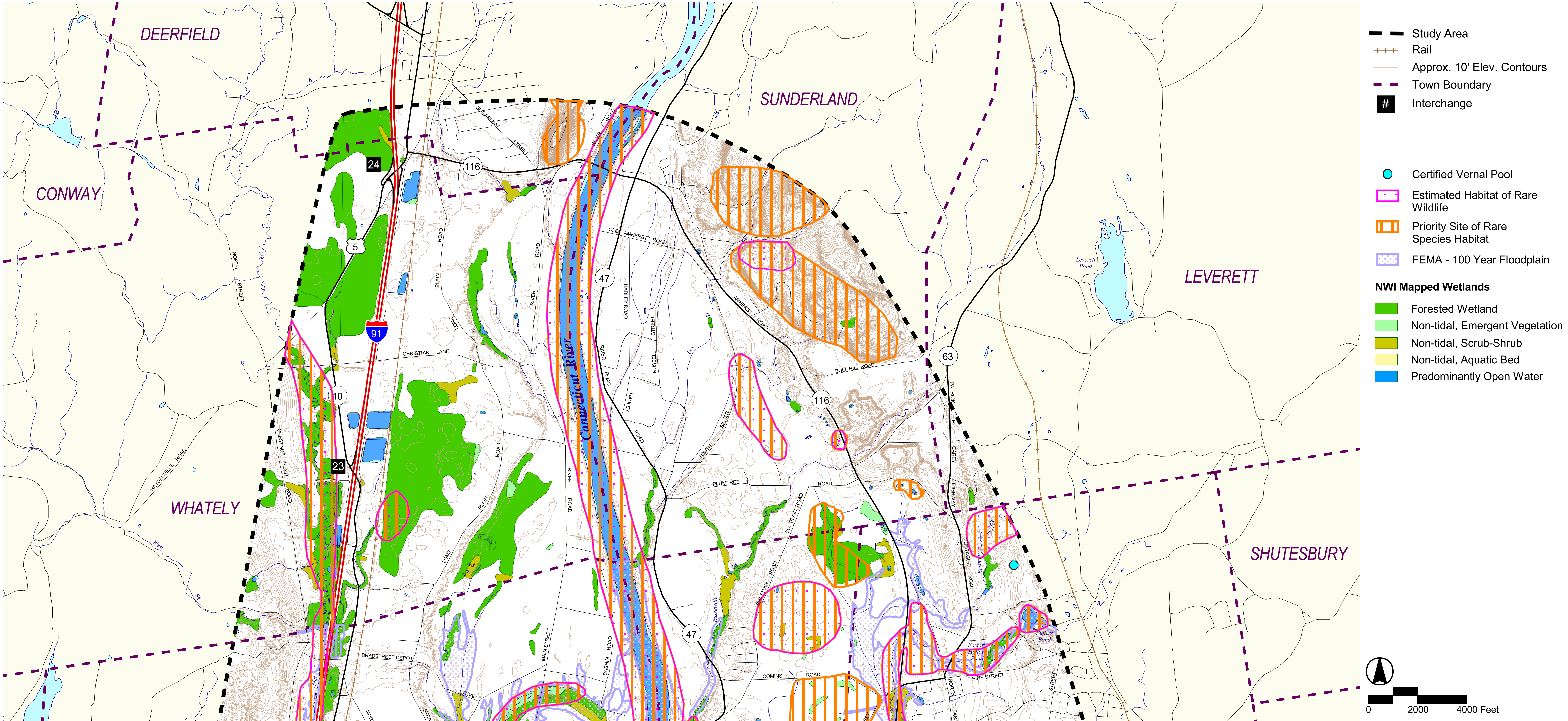
[3] Field investigations of wetlands will occur during the evaluation of alternatives.



MASS HIGHWAY

Connecticut River Crossing
Transportation Study

Figure 3-2
Wetlands and Rare Species

(Sheet 1 of 3)

Source: MassGIS.

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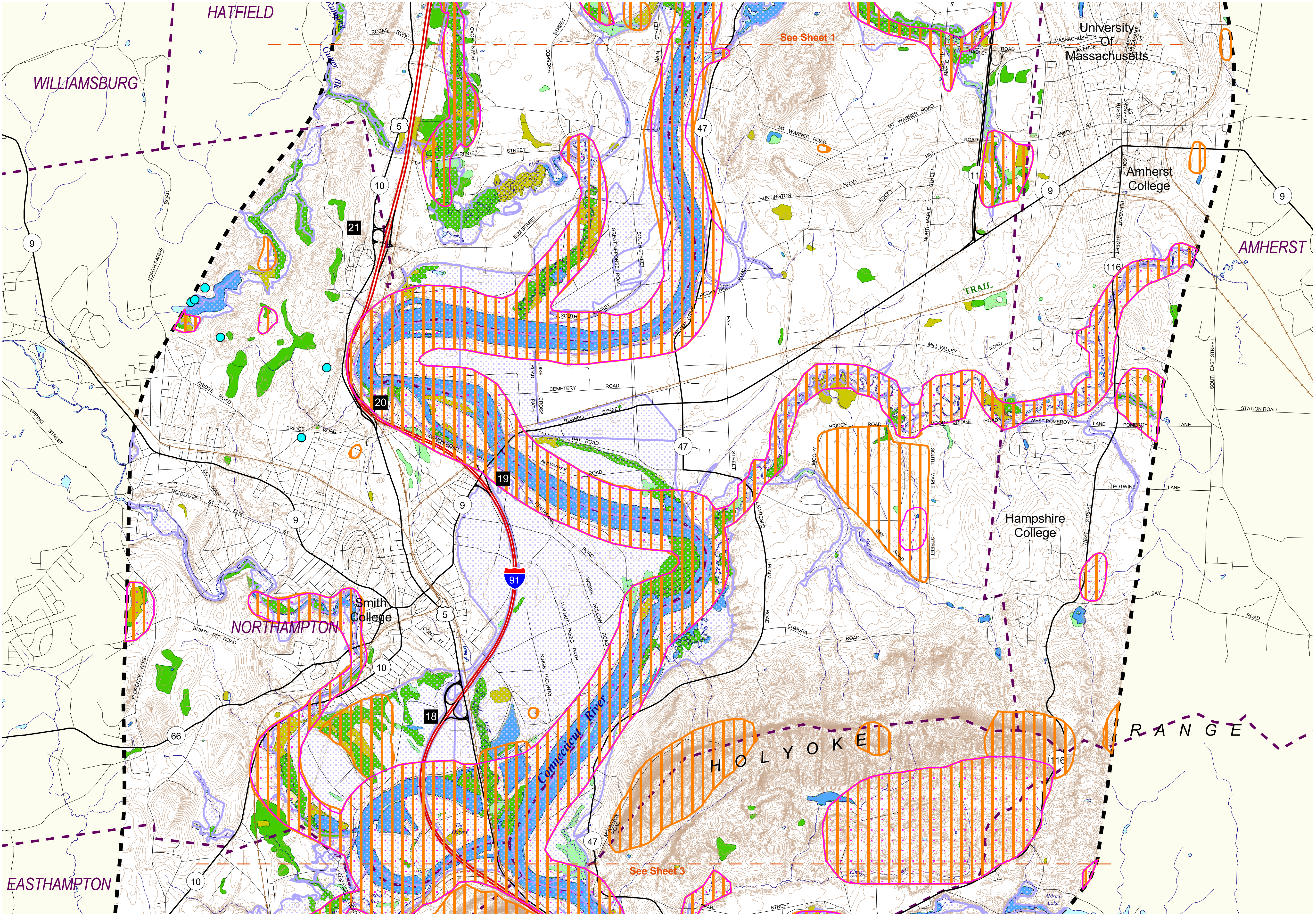

- ▬ ▬ Study Area
- ┼┼┼ Rail
- ─ Approx. 10' Elev. Contours
- ‒ ‒ Town Boundary
- ‒ ‒ Rail Trail / Bikeway
- ■ Interchange
- ● Certified Vernal Pool
- ▭ Estimated Habitat of Rare Wildlife
- ▥ Priority Site of Rare Species Habitat
- ▨ FEMA - 100 Year Floodplain

NWI Mapped Wetlands

- 🟩 Forested Wetland
- 🟩 Non-tidal, Emergent Vegetation
- 🟨 Non-tidal, Scrub-Shrub
- 🟨 Non-tidal, Aquatic Bed
- 🟦 Predominantly Open Water

0 2000 4000 Feet

MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 3-2
Wetlands and Rare Species

(Sheet 2 of 3)

Source: MassGIS.

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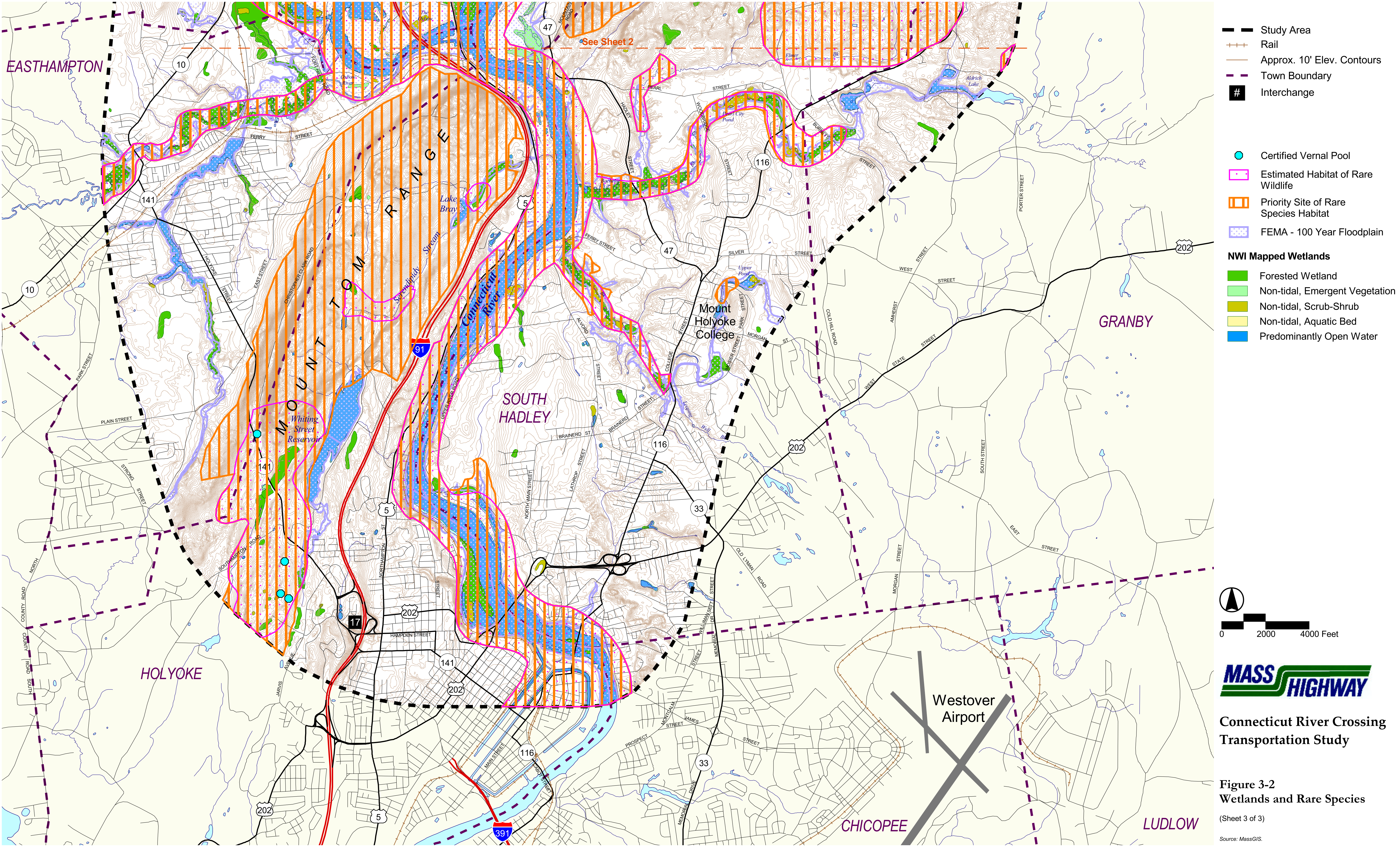

Connecticut River Crossing Transportation Study

Figure 3-2
Wetlands and Rare Species

(Sheet 3 of 3)

Source: MassGIS.

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The wetlands in the study area were categorized based on the information contained on the NWI and USGS maps. These categories include forested wetlands, shrub wetlands, emergent wetlands, small ponds, and open water. All categories are equally protected under federal and state regulatory programs.

Wetland Distribution and Significance

Wetlands, water bodies, and waterways are an important part of the study area landscape. Of the vegetated wetlands in the study area, forested wetlands are the most common, and emergent wetlands are the least common. Figure 3-2 depicts the distribution of the wetland types in the study area.

As shown on Figure 3-2, vegetated wetlands occur throughout the study area. Sections of the study area where there are large concentrations of wetlands or extensive wetland systems include:

- East and west of Route 5 in the northwest portion of the study area (in Deerfield and Whately);
- Adjacent to the Mill River in Whately and Hatfield;
- Between the railroad and Long Plain Road in Whately;
- East of Long Plain Road in Whately;
- Adjacent to Great Pond in Hatfield;
- Adjacent to the Mill River in Amherst and Hadley; and
- Adjacent to the Mill River and north of the Oxbow complex in Northampton.

The wetlands in the study area provide a variety of functions and values. Some of these wetlands provide habitat for rare or endangered plants and wildlife or are important waterfowl migratory areas, and some play an important role in water supply. Most of the wetlands in the study area provide habitat for fish and wildlife, flood control functions, water quality functions, including sediment retention, water filtration, and nutrient uptake, and opportunities for hunting, fishing, and other outdoor recreation. The forested wetlands may also provide fuelwood and timber.

Floodplains

Floodplains are low-lying areas adjacent to streams, rivers, and coastlines that are inundated and store water during flooding events. Flood storage capacity provided by the floodplain can reduce flooding impacts on downstream land by reducing peak flows. Floodplains are regulated under federal and state programs.

The limits of the floodplains in the study area were determined through available Geographic Information System (GIS) mapping based on the Federal Emergency Management Agency (FEMA) National Flood Insurance Protection (NFIP) data.

The 100-year floodplain is the estimated maximum lateral extent of floodwater, which will theoretically result from the statistical 100-year frequency storm. Based on flood profile data, FEMA has mapped the 100-year floodplains for all the communities in the study area.

Floodplain Distribution and Significance

The mapped floodplains in the study area are generally associated with the larger rivers and streams and their tributaries (*i.e.*, the Connecticut River, the Mill River in Whately and Hatfield, the Mill River in Amherst and Hadley, the Fort River in Amherst and Hadley, Harts Brook in Hadley, the Mill River in Northampton, the Oxbow in Northampton, Bachelor Brook in Granby and South Hadley, Stony Brook in South Hadley, Broad Brook in Easthampton, and the Whiting Street Reservoir in Easthampton).

Floodplains in the study area are particularly important in flood control and storm damage prevention. During high flows or flooding events, floodplains provide storage for floodwaters, and aid in pollution prevention by allowing time for pollutants and sediments to settle before discharge. Floodplains also function to prevent storm damage by reducing peak flows in waterways. Floodplains are an important resource for fisheries and wildlife, especially in undeveloped areas with associated wetland systems. Floodplains often receive nutrients from floodwaters that provide rich, moist habitats for wildlife habitat.

3.3.2 Surface and Groundwater Resources

Surface and ground water are important natural resources that have a variety of uses including public drinking water, irrigation, industrial, and as habitat for wildlife. Water quality is determined by the amount of dissolved or suspended material that water may contain. The water quality of surface water and ground water is influenced by surficial geology, land use, and water quality of source waters. The use of water may be limited by its physical and chemical characteristics. Figure 3-3 illustrates the surface and groundwater resources in the study area.

According to the Massachusetts Surface Water Quality Standards, waterways within the study area are either Class A or Class B waters. Class A waters are designated as Public Drinking Water Supplies (PWS), and as such are Outstanding Resource Waters (ORWs). They are also considered excellent habitat for aquatic and terrestrial species, and suitable for primary and secondary recreation including swimming, fishing, and boating. Class A waters have excellent aesthetic value. The Whiting Street Reservoir is an example of a Class A water.

The Connecticut River is designated as a Class B water within the study area. Class B waters are designated as habitat for fish, other aquatic life, and wildlife, as well as designated for recreation, including swimming, water skiing, fishing, and boating. Class B waters are suitable as a public drinking water supply with appropriate treatment, and are suitable for irrigation, other agricultural uses, and industrial cooling and process uses. Class B waters have consistently good aesthetic value.

There are 28 mapped PWS in the study area. These include public community surface and groundwater supply sources, and public non-community supply sources.

Associated with the PWS are designated Surface Water Supply Protection Zones:

- **ZONE A:** represents a) the land area between the surface water source and the upper boundary of the bank; b) the land area within a 400 foot lateral distance from the upper boundary of the bank of a Class A surface water source, as defined in 314 CMR 4.05(3)(a); and c) the land area within a 200 foot lateral distance from the upper boundary of the bank of a tributary or associated surface water body.

- **ZONE B:** represents the land area within one-half mile of the upper boundary of the bank of a Class A surface water source, as defined in 314 CMR 4.05(3)(a), or edge of watershed, whichever is less. Zone B always includes the land area within a 400 ft lateral distance from the upper boundary of the bank of the Class A surface water source.

- **ZONE C:** represents the land area not designated as Zone A or B within the watershed of a Class A surface water source, as defined in 314 CMR 4.05(3)(a).

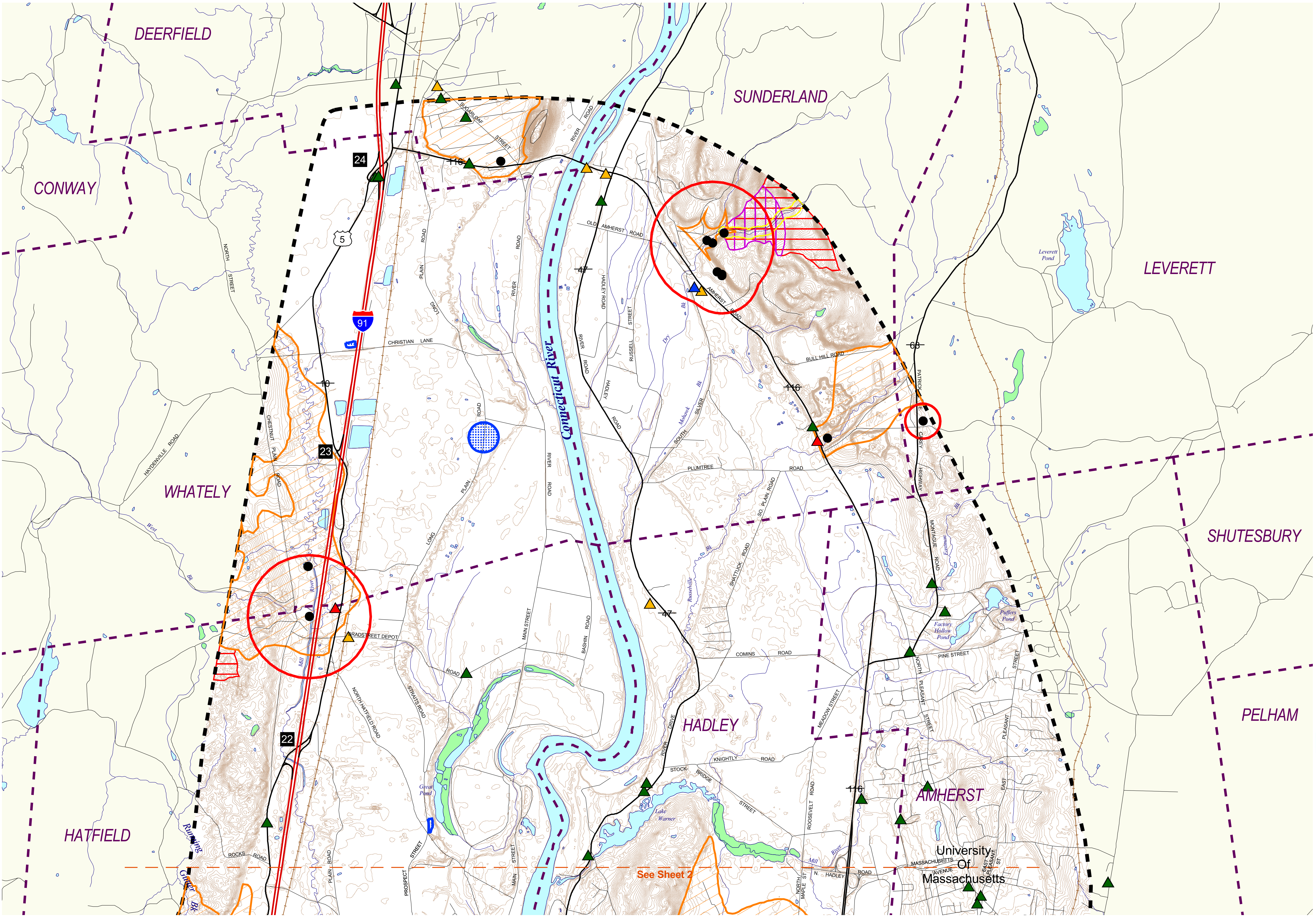
Ground water resource areas are defined and regulated pursuant to the Massachusetts Drinking Water Regulations. The ground water supply protection areas (310 CMR 22.21) are described as follows:

- **Zone II:** The area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated.

- **Interim Wellhead Protection Area (IWPA):** The area within a half-mile radius of a well that lacks a department-approved Zone II.

Sole Source Aquifers

The U.S. Environmental Protection Agency designates Sole Source Aquifers (SSA) under the Federal Safe Drinking Water Act. Sole source aquifers are designated in areas that have few or no alternative sources of drinking water to the ground water resource. There is one SSA in Easthampton and Holyoke.


DEERFIELD
CONWAY
SUNDERLAND
LEVERETT
WHATELY
SHUTESBURY
HADLEY
PELHAM
HATFIELD
AMHERST
University Of Massachusetts
Connecticut River
24
23
22
5
91
116
47
63
10
See Sheet 2
Study Area
Rail
Approx. 10' Elev. Contours
Town Boundary
# Interchange
Surface and Groundwater Resources
● DEP Public Water Supply
DEP Interim Wellhead Protection Area
DEP Zone IIs
DEP Zone A
DEP Zone B
DEP Zone C
EPA Sole Source Aquifer
Hazardous Material / Solid Waste Facilities
▦ DEP Solid Waste Facilities
Massachusetts Contingency Plan (MCP) Sites
▲ Tier I MCP Site
▲ Tier II MCP Site
▲ Pre-Classified MCP Site
▲ Downgradient Property Status Site
▲ RAO MCP Site
0
2000
4000 Feet
MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 3-3
Surface and Groundwater Resources

(Sheet 1 of 3)

Source: MassGIS.

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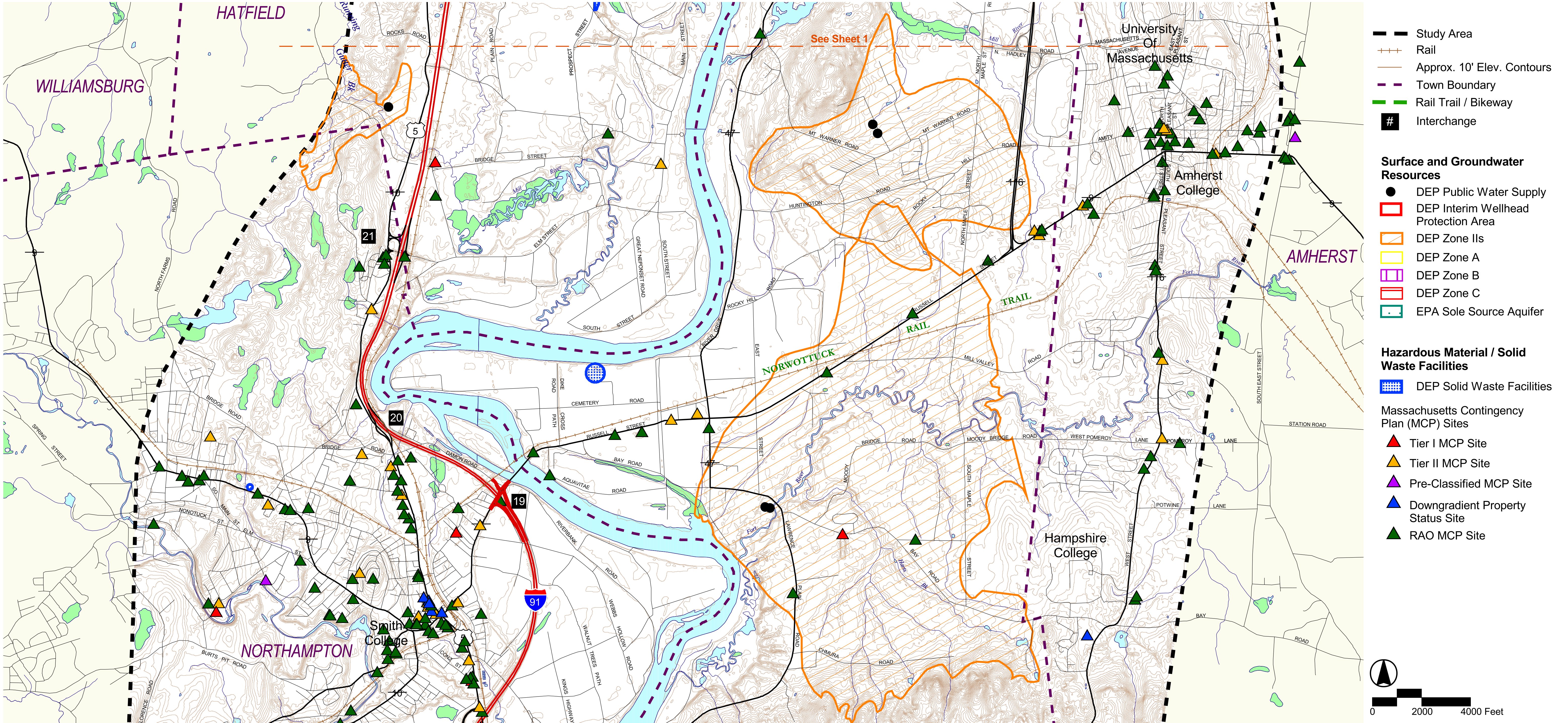

- ▬ ▬ Study Area
- ┼┼┼ Rail
- ─ Approx. 10' Elev. Contours
- ╍ Town Boundary
- ▬ ▬ Rail Trail / Bikeway
- # Interchange

Surface and Groundwater Resources

- ● DEP Public Water Supply
- ☐ DEP Interim Wellhead Protection Area
- ▨ DEP Zone IIs
- ☐ DEP Zone A
- ▥ DEP Zone B
- ☐ DEP Zone C
- ☐ EPA Sole Source Aquifer

Hazardous Material / Solid Waste Facilities

- ▦ DEP Solid Waste Facilities

Massachusetts Contingency Plan (MCP) Sites

- ▲ Tier I MCP Site
- ▲ Tier II MCP Site
- ▲ Pre-Classified MCP Site
- ▲ Downgradient Property Status Site
- ▲ RAO MCP Site

MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 3-3
Surface and Groundwater Resources

(Sheet 2 of 3)

Source: MassGIS.

Graphic file: \\Mawatr\GIS\08036\PS-PDF\S&GWResFig3-3-2.pdf
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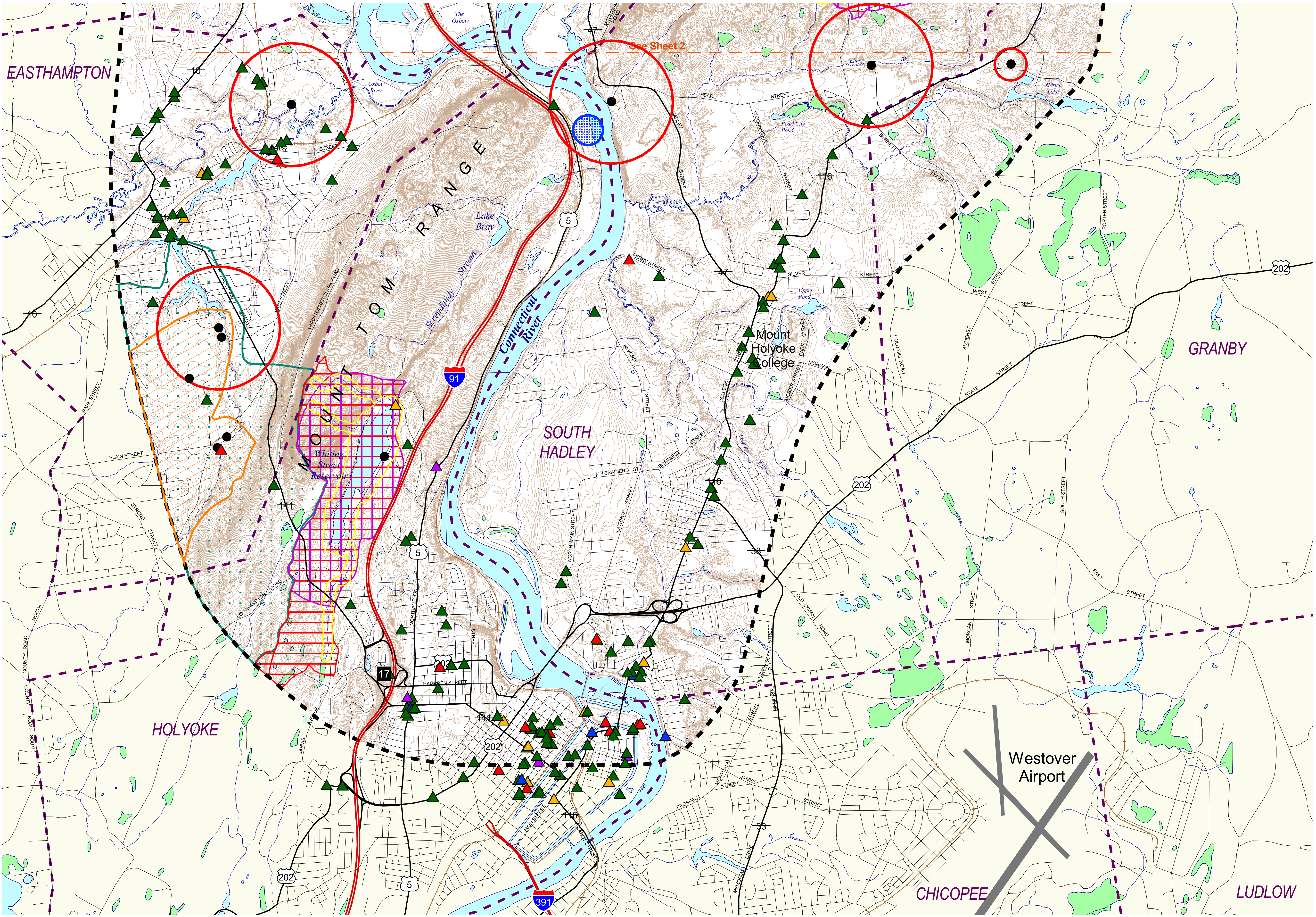


- ▬ ▬ Study Area
- ┼┼┼ Rail
- ― Approx. 10' Elev. Contours
- ‒ ‒ Town Boundary
- ■ Interchange

Surface and Groundwater Resources

- ● DEP Public Water Supply
- ▭ DEP Interim Wellhead Protection Area
- ▨ DEP Zone IIs
- ▭ DEP Zone A
- ▥ DEP Zone B
- ▭ DEP Zone C
- ▭ EPA Sole Source Aquifer

Hazardous Material / Solid Waste Facilities

- ▦ DEP Solid Waste Facilities

Massachusetts Contingency Plan (MCP) Sites

- ▲ Tier I MCP Site
- ▲ Tier II MCP Site
- ▲ Pre-Classified MCP Site
- ▲ Downgradient Property Status Site
- ▲ RAO MCP Site

0 2000 4000 Feet

MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 3-3
Surface and Groundwater Resources

(Sheet 3 of 3)

Source: MassGIS.

Graphic file: \\Mawatr\GIS\08036\PS-PDF\S&GWResFig3-3-3.pdf
Application Source: \\Mawatr\GIS\08036\Apr-mxd\ct_river_crossing_2.apr

3.3.3 Rare Species and Vernal Pools

Rare species are important to biodiversity because they represent elements of an ecological system that are unique or few in number. Federal and state laws protect rare plants and animals and their critical habitats. Figure 3-2 shows the limits of the rare species habitats mapped by the Massachusetts Natural Heritage and Endangered Species Program (NHESP). The NHESP and United States Fish and Wildlife Service were also contacted to determine whether any federal fish or wildlife species occur in the study area.

Based upon the 2000-2001 Edition of the Massachusetts Natural Heritage Atlas, published by NHESP, there are 25 Estimated Habitats of Rare Wildlife and 40 Priority Habitats of Rare Species. Many of these habitat polygons overlap one another but are separate in their regulatory jurisdiction. Estimated Habitats of Rare Wildlife are protected under the Massachusetts Wetlands Protection Act while Priority Habitats of Rare Species are protected by the Massachusetts Endangered Species Act (plants and animals).

Vernal pools provide an important wildlife habitat type. These are generally small, seasonally-inundated wetlands which lack fish and provide breeding habitat for amphibians (wood frogs, ambystomid salamanders), and which may be utilized by reptiles and other wildlife. Eleven vernal pools certified by the NHESP are scattered throughout the study area as depicted on Figure 3-2. These are small pools or seasonal ponding areas within bordering vegetated wetlands, or small isolated wetlands.

3.3.4 Historic and Archaeological Resources

Federal policy set forth in the National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470 *et seq.*) includes preserving “the historical and cultural foundations of the Nation” and preserving irreplaceable examples important to our national heritage to maintain “cultural, educational, aesthetic, inspirational, economic, and energy benefits.” The NHPA also established the National Register of Historic Places (National Register) composed of “districts, sites, building, structures, and objects significant in American history, architecture, archaeology, engineering, and culture.” Section 106 of the NHPA requires that Federal agencies take into account the effects of their actions on properties eligible for or included in the National Register, and permit the Advisory Council on Historic Preservation (ACHP) an opportunity to review such actions. Federal agencies consult as appropriate with state historic preservation officers, tribal historic preservation officers or representatives, and other interested parties in fulfilling Section 106 requirements. Section 106 further requires Federal agencies to propose and evaluate alternatives to undertakings that would adversely affect historic properties, or to adequately mitigate adverse effects if avoidance cannot be reasonably achieved.

The office of the State Historic Preservation Officer in Massachusetts is housed within the Massachusetts Historic Commission (MHC). The State Register of Historic Places (SRHP) was established by Massachusetts General Law Chapter 9, Sections 26-27c, as amended by Chapter 152 of the Acts of 1982 and Chapter 254 of the Acts of 1985, and is maintained by the MHC.

The State Register includes several types of historic resources, including archaeological sites, historic sites, historic districts, buildings, structures, objects, and landscapes that are listed in the National Register, or are subject to other local, state or federal statutes. MassGIS mapping identified the locations or boundaries of historic properties included in the SRHP. However, because the information regarding historic resources on MassGIS is only current through 1997, additional research was conducted to identify historic resources within the study area that were listed on the SRHP after 1997. Specifically, a review of the MHC's office copy of the SRHP (updated weekly) was conducted. This research revealed eight additional SRHP listed historic resources. Table 3-1 lists all historic resources identified within the study area. Historic sites and districts in the Study Area are also depicted on Figure 3-4.

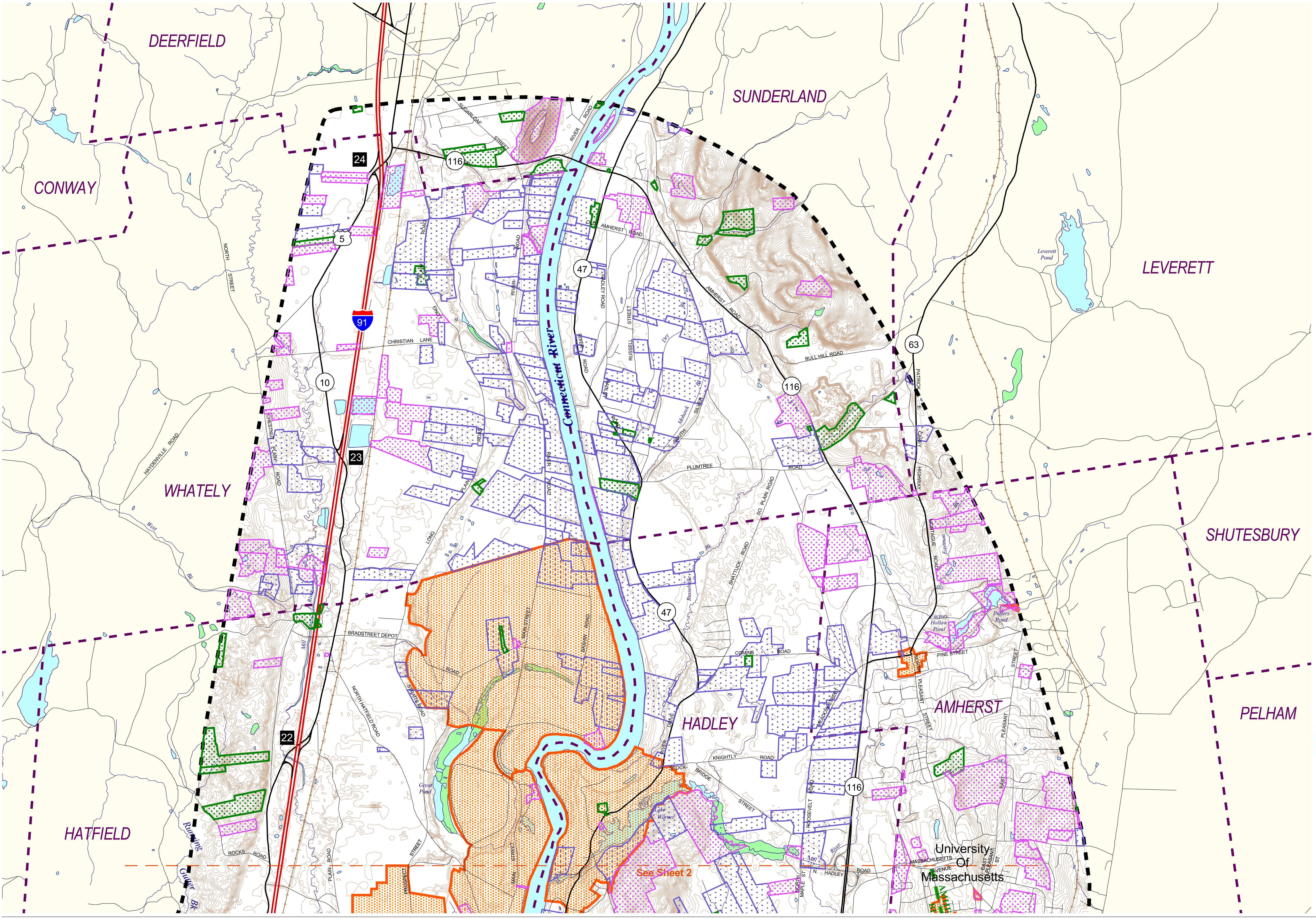
Because locational information on archaeological sites included in the SRHP is not public record, it is not available from MassGIS. Therefore, a review of the MHC's archaeological base maps was also conducted to identify recorded archaeological sites within the study area. This research revealed multiple recorded archaeological sites. The information regarding recorded archaeological sites will be taken into consideration in the development of alternatives.

Table 3-1
National and /or State Listed Historic Resources in the Study Area

Town	Historic Resource
Amherst	North Amherst Center Historic District Amherst Central Business District Lincoln - Sunset Historic District East Village Historic District Prospect - Gaylord Historic District Dickinson Historic District South Amherst Common Historic District Strong House Conkeys - Stevens House Theodore Baird House Emily Dickinson House The Evergreens Amherst West Cemetery † Westside Historic District † Cushman Village Historic District
Easthampton	The Town Hall Main Street Historic District U. S. Post Office - Easthampton Main Branch
Hadley	Hadley Center Historic District Hockanum Rural Historic District North Hadley Historic District Porter - Phelps - Huntington House Hockanum School †
Hatfield	Hatfield Center Historic District Old Mill Site Historic District Upper Main Street Historic District Mill-Prospect Street Historic District † Bradstreet Historic District † Billings Way Tobacco Barn † Elm Street Historic District †
Holyoke	Holyoke Canal System Holyoke City Hall Caledonia Building U. S. Post Office – Holyoke Main Branch Hadley Falls Company Housing District North High Street Historic District North High Street Historic District (Boundary Increase) Wistariahurst
Northampton	Veteran's Administration Medical Center Northampton State Hospital Northampton Downtown Historic District Northampton Downtown Historic District Extension Fort Hill Historic District Elm Street Historic District Parsons, Shepard and Damon Houses Calvin Coolidge House The Manse Academy of Music Miss Florence Diner †
South Hadley	U. S. Post Office – South Hadley Main Branch Woodbridge Street Historic District

Source: MassGIS (1997) and Massachusetts Historical Commission

†: Indicates additional properties listed at MHC that are not included in the MassGIS database.



- ▬ ▬ Study Area
- ┼┼┼ Rail
- — Approx. 10' Elev. Contours
- ▬ ▪ Town Boundary
- # Interchange
- ● Historic Site
- ▨ Historic District

Protected Open Space

- ▨ Section 4(f) and 6(f)
- ▨ Conservation or Agricultural Restriction
- ▨ Other Protected Open Space

0 2000 4000 Feet

MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 3-4
Historic Districts and Protected Open Space

(Sheet 1 of 3)

Source: MassGIS.

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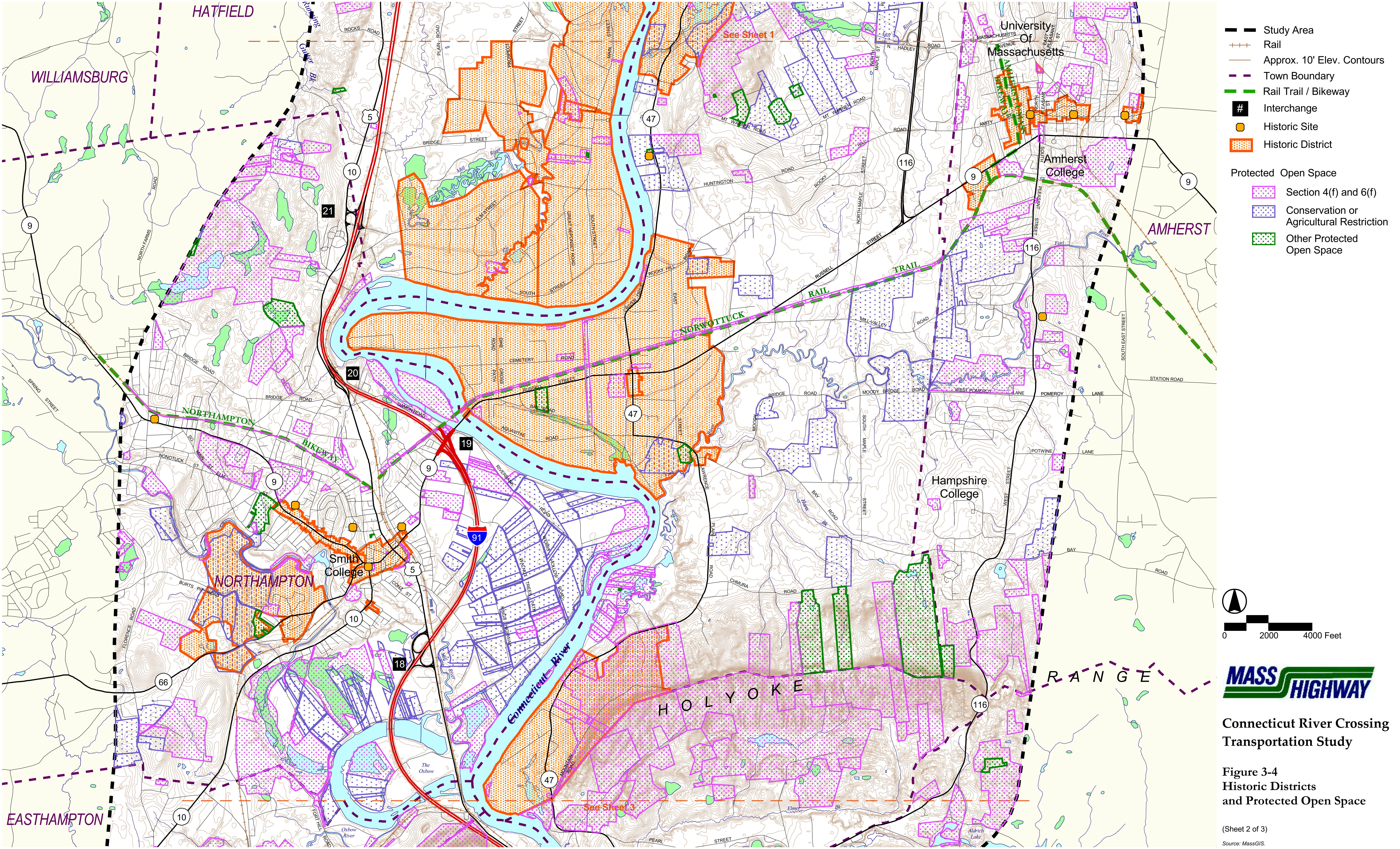

MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 3-4
Historic Districts and Protected Open Space

(Sheet 2 of 3)

Source: MassGIS.

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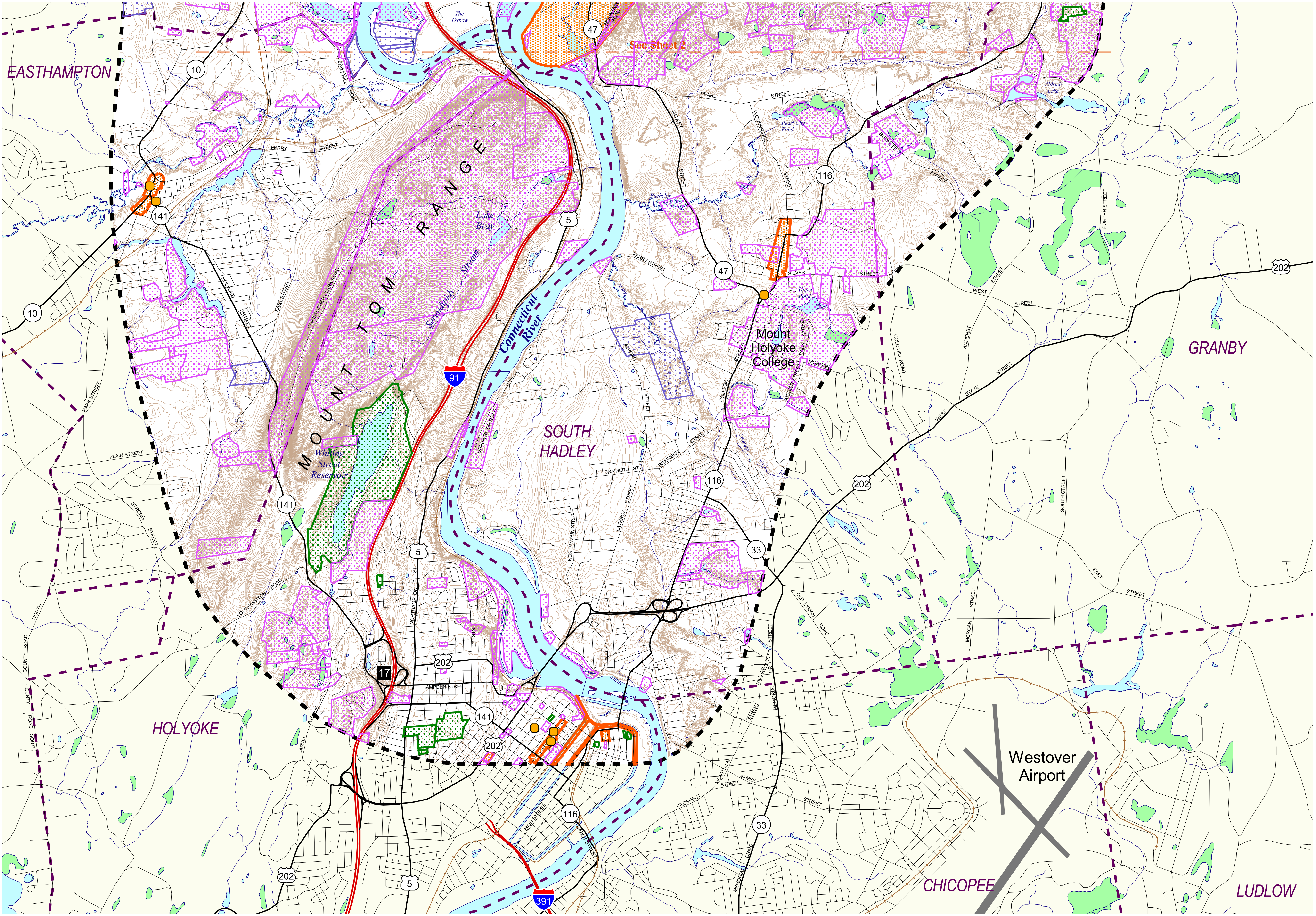


- ▬ ▬ Study Area
- ┼┼┼ Rail
- — Approx. 10' Elev. Contours
- ▬ ▬ Town Boundary
- ■ Interchange
- ● Historic Site
- ▨ Historic District

Protected Open Space

- ▨ Section 4(f) and 6(f)
- ▨ Conservation or Agricultural Restriction
- ▨ Other Protected Open Space

0 2000 4000 Feet

MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 3-4
Historic Districts
and Protected Open Space

(Sheet 3 of 3)

Source: MassGIS.

Graphic File: \\Mawatr\GIS\08036\PS-PDF\4F-6F_Fig3-4-3.pdf
Application Source: \\Mawatr\GIS\08036\Apr-MXD\ct_river_crossing_3.apr

3.3.5 Protected Open Space Properties

The study area contains approximately 780 parcels of land that are protected as open space. These parcels include parks, wildlife refuges, recreation areas, state and town forests, agricultural land, cemeteries, schools, watershed protection areas, and historic and archeological sites. These properties can be either publicly or privately owned. Parcels of private land within the project area are primarily protected as open space through conservation or agricultural restrictions. Individual municipalities or one of various state or federal agencies can own public land. Publicly owned open space may be protected through Section 4(f) of the Department of Transportation Act or Section 6(f) of the Land and Water Conservation Fund Act.

Figure 3-4 represents the protected open space and historic properties in the study area and are grouped into four categories: public property subject to Section 4(f) and Section 6(f) regulations; private property protected by conservation or agricultural restrictions; and other protected open space property.

Section 4(f) Properties

The Section 4(f) regulations state that the Secretary of Transportation may not approve a transportation program or project requiring the use of a significant publicly owned land of a public park, wildlife and waterfowl refuge or land of a historic site of National, State or local significance unless certain specific conditions are met. These conditions include clear documentation that no feasible and prudent alternative exists; and that the action includes all possible planning to minimize harm to the property resulting from such use. “Use” of these public lands includes land acquisition, constructive use, and temporary construction easements.

There are 407 properties within the project area potentially subject to protection under Section 4(f) of the Department of Transportation (DOT) Act of 1966. These properties meet the requirements for Section 4(f) protection, however, the determination of an individual property’s significance would be made at a later stage of project development. The goal of the Section 4(f) regulations is the total avoidance and preservation of property protected under Section 4(f).

Section 6(f) Properties

There are sixteen properties within the study area subject to Section 6(f). Section 6(f) of the Land and Water Conservation Fund Act states that property that is acquired or developed with assistance under U.S. Land and Water Conservation Funds cannot be converted to uses other than public outdoor recreation without approval from the U.S. Secretary of the Interior. Furthermore, for the Secretary to approve a conversion of use, there must be a substitution of other recreation property of equal market value and of reasonably equivalent usefulness and location.

Other Protected Open Space Properties

There are 141 parcels of private land within the project area that are protected by conservation or agricultural restrictions. Agricultural restrictions are granted under Massachusetts Chapter 61A that has been established to encourage the preservation of the Commonwealth's valuable farmland and promote active agricultural and horticultural land use. It offers significant local tax benefits to property owners willing to make a long-term commitment to farming. The municipality in which the property is located has the right of first refusal on the sale of any property protected by an agricultural restriction.

A conservation restriction is a legally binding agreement between a landowner and a holder - usually a public agency or a private land trust; whereby the landowner agrees to limit the use of his/her property for the purpose of protecting certain conservation values. The conservation restriction may run for a period of years or in perpetuity.

There are an additional 292 parcels of private land and 115 parcels of public land not protected by Section 4(f) or 6(f) or through conservation or agricultural restrictions that may be protected as open space through other federal, state or local regulation.

3.3.6 Special Focus Areas

The Silvio O. Conte National Fish and Wildlife Refuge Act, signed in 1991, mandated that the U.S. Fish and Wildlife Service study the 7.2-million acre Connecticut River watershed in Connecticut, Massachusetts New Hampshire, and Vermont and create a new fish and wildlife refuge. The refuge is unique in that the boundary will be formed as land is acquired determined

3.3.7 Hazardous Material and Solid Waste Facility Sites

To identify existing hazardous waste sites and solid waste facilities in the SA, several environmental databases were referenced. The three databases selected for constraint mapping included:

- ➤ Massachusetts Contingency Plan Sites (MCP or Mass. State Hazardous Waste Sites);
- ➤ National Priority Listing Sites (NPL or Federal Superfund Sites); and
- ➤ Massachusetts Solid Waste Facilities.

These three databases include information related to existing hazardous waste sites and solid waste facilities that have been reported to the Massachusetts Department of Environmental Protection (DEP) Bureau of Waste Site Cleanup, DEP Bureau of Waste Prevention, and the Environmental Protection Agency.

A database search was conducted by New England DataMap (NED) Resources to provide a listing of all MCP Sites and Superfund sites within the study area that have had a documented release of oil and/or hazardous materials (OHM). A listing of solid waste facilities from MassGIS was also obtained.

Database Search Results – MCP, Superfund Sites

The Massachusetts Contingency Plan (MCP) is a Department of Environmental Protection regulation (310 CMR 40.0000) that requires any person to notify the Department of a release or threat of release of oil and/or hazardous material and perform appropriate response actions. Within the study area, the database search identified over 1,000 individual spills or releases that the DEP maintains records. Of these 1,000 sites, approximately 125 properties could not be mapped/located within the limits of the study area because of insufficient address information. Many of these non-mapped sites consist of low impact spills that have been adequately remediated. An additional 300 sites were also eliminated from this summary. These 300 sites primarily consisted of spills that have also been adequately remediated. The remaining sites were sorted into seven categories that represented the greatest importance to assessing potential constraints from contaminated sites within the study area, as shown in Table 3-2.

Table 3-2
Hazardous Materials and Solid Waste Facility Sites

Site Classification	Number of Sites
EPA Superfund Sites	0
Solid Waste Facilities	7
MCP Sites	
Tier I MCP Sites	37
Tier II MCP Sites	108
Pre-Classified MCP Sites	35
Downgradient Property Status MCP Sites	17
RAO MCP Sites	389
Total	***593***

As shown in the table, there are 593 sites, of which 586 are MCP sites and 7 are solid waste facilities. There are no EPA superfund sites in the study area. As shown in the above table, the MCP sites were placed into five categories, based on the progress of the cleanup, the relative magnitude of the hazard/contamination, and whether the site has been remediated (closed status). The MCP Sites and Solid Waste Facilities are mapped on Figure 3-2.

EPA Superfund Site

The Environmental Protection Agency (EPA) established a numerical ranking system for which certain properties are placed on a National Priority List (NPL) of the nations worst hazardous waste sites. NPL sites or Superfund sites are EPA-managed cleanup sites that qualify for federal funding. No Superfund sites were identified within the study area.

Open MCP Sites

The active or open MCP hazardous waste sites were categorized into the following three subcategories: Tier I, Tier II, and Pre-Classified. These three subcategories of MCP Sites are either undergoing additional assessments to define the extent of contamination or are in active remediation.

Tier I MCP Sites

The MCP establishes timeframes for which contaminated properties must be cleaned up (remediated) to a "Condition of No Significant Risk." The first timeframe milestone is one year following initial DEP notification. Sites that are remediated within one year are generally viewed as smaller, less complicated contaminated sites. Sites that are not remediated within one year must be classified into one of four (4) categories. The categories are Tier IA, IB, IC, and II. Sites are usually tier classified using the Numerical Ranking System (NRS). The NRS score is a point system based on a variety of factors that include the site's complexity, the type of contamination, and the potential for human or environmental exposure to the contamination. In addition, some sites are automatically classified as Tier I sites if they pose an imminent hazard, affect public water supplies, or miss regulatory deadlines. Tier I sites are more complex contaminated sites as compared to a Tier II site, with Tier IA sites signifying the greatest risk to human health and the environment. All Tier I sites require Tier I permits and require a specific level of DEP oversight during the cleanup process. A total of 37 Tier I sites were identified within the study area.

Tier II MCP Sites

The majority of the sites requiring Tier classification following the one-year deadline are classified as Tier II. Tier II sites do not require a Tier permit nor do they require increased DEP oversight. Tier II sites signify less risk to human health and the environment as compared to Tier I sites. A total of 108 Tier II sites were identified within the study area.

Pre-Classified MCP Sites

Sites that have been reported to the DEP as being contaminated are listed on the DEP's database as an MCP site. MCP Sites that are undergoing remediation or additional assessments and have not been Tier Classified, have been placed into this "Pre-Classified" category. As the one-year milestone approaches, the Pre-Classified sites will either be Tier Classified or receive a Response Action Outcome Statement (closed status). A total of 35 Pre-Classified MCP sites were identified within the study area.

Downgradient Property Status Site

Many sites reported to the DEP are a result of contamination migrating in groundwater from an upgradient parcel. The downgradient-affected parcel has been contaminated as a result of contamination in groundwater flowing from an upgradient parcel(s). MCP sites receive a Downgradient Property Status (DPS) classification if it is demonstrated that the source of contamination is from an upgradient source. DPS sites generally indicate the presence of a migrating groundwater contaminant plume. A total of 17 DPS MCP sites were identified within the study area.

RAO MCP Sites

This designation indicates that the site has received a Response Action Outcome (RAO) Statement. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated. An RAO MCP site does not necessarily indicate that contamination in soil or groundwater is not present. An RAO indicates that the contaminant levels that are present are at concentrations that do not pose a significant risk to human health and the environment for existing and certain future site uses. In many cases, RAO MCP sites have an Activity and Use Limitation (AUL) recorded at the registry of deeds. The AUL is a deed restriction that prohibits certain site uses that would not maintain a "Condition of No Significant Risk", as defined by the MCP. A total of 389 RAO MCP sites were identified within the study area.

Solid Waste Facilities

The Solid Waste Facility Datalayer downloaded from MassGIS was compiled by DEP to track the locations of landfills, transfer stations, and combustion facilities. The datalayer contains the majority of the facilities currently regulated under DEP's solid waste regulations. A total of 7 solid waste facilities were identified within the study area.

3.4 Summary

The environmental resources described in this chapter are all important to the process of evaluation of transportation alternatives. Some resources are afforded more protection under the various local, state and federal regulatory programs than others. Wetlands, rare species, and Section 4(f)/6(f) properties are often viewed as the most sensitive resources and avoidance of them is often given higher priority when trying to balance among competing interests. Impacts to these resources should generally be avoided or minimized to the greatest extent possible. Impacts will need to be mitigated appropriately.

4.0 Future Transportation Conditions

This chapter describes the future transportation conditions expected within the study area. Sections of this chapter present an overview of the forecasting method and assumptions, the future traffic volumes and operations, the impacts of these volumes on capacity and level of service (LOS), and a summary of the future deficiencies for the intersections within the study area. The future conditions described in this chapter assume that the transportation improvements currently under construction or programmed have occurred. Later chapters will present the alternatives, an evaluation of alternatives, and recommendations to address the short, medium, and long-term transportation needs in the study area.

The future conditions analyses presented in this chapter reveal the following key issues:

- Growth of almost 25 percent is projected at several locations throughout the study area from 2002 to 2025;
- Increased congestion is expected to occur at many locations, especially along the Route 9 corridor from I-91 to Amherst Center;
- Increased demands occur on all three Connecticut River bridges with the highest increases occurring on the Coolidge Bridge;
- From 2002 to 2025, traffic on the Coolidge Bridge is forecast to grow by 24 percent, or approximately 0.94 percent annually;
- Many capacity and LOS deficiencies resulting from the volume increases are expected to occur, especially along the Route 9 corridor from I-91/Damon Road to Amherst Center;
- Addressing the capacity deficiencies can be accomplished through better system management, or capacity enhancing improvements that either directly address the problem location or indirectly address the problem by diverting traffic demands.

4.1 Forecasting Future Traffic Conditions – 2002 to 2025

An important component of this study involved forecasting travel demands and patterns to the year 2025. A 2025 planning horizon year was chosen for this study to ensure that alternatives studied anticipate needs and provide long-term benefits for the study area. Once existing traffic volumes have been quantified, predicting changes in future travel demand is best accomplished through understanding and mapping expected changes in land uses and demographics, and entering this information into a regional travel demand forecasting model. To accomplish this task, models from the Pioneer Valley Planning Commission (PVPC) and Franklin Regional Council of Governments (FRCOG) were merged and used to predict future traffic volumes on roadways within the study area for the design year 2025.

4.1.1 Overview of Travel Demand Modeling Theory

In a regional travel demand model, traffic volumes are forecast through the interaction of transportation demand and supply. Traffic zones are defined to encompass areas of development that represent the demand, while the actual road network represents the supply. A computerized network is developed consisting of a series of points, or nodes, that graphically show locations of roadway intersections and other elements of the network. Connections between nodes are called links. Links represent highway segments and contain information such as speed and road capacity. Traffic zones contain demographic and employment information, and are represented by special nodes called centroids. Each zone is attached, or "loaded," onto the network by specialized links called centroid connectors.

Each traffic zone produces and attracts person trips based on its land use. Information entered into the model for each zone (such as population, households, income and employment) determines the amount of trips produced and attracted to that zone. Households are the primary producer of trips, while employment sites are the primary trip attractors. These productions and attractions are converted to vehicle trips that enter and leave each zone. The fact that people make trips for different purposes (work, shopping, school, personal business, recreation, etc.) - and have different vehicle occupancy rates in doing so - is also calculated into the model. This entire process is called trip generation.

The process of trip distribution determines where the trips end up once they leave their traffic zones. Trip distribution produces a matrix of origins and destinations between all zones for each trip purpose. This is done according to the "attractiveness" of a zone, based on its proximity to other zones and on the total number of trips generated in that zone. Zones that are closest to each other will have more trips flowing between them, all other things being equal. The more trips a zone generates relative to all other zones, the greater the "pull" it will exert on all other zones in terms of attracting trips. The trip distribution step is based on the gravity model.

Trip assignment determines what route, or path, trips will take in going from zone to zone. It is here where the travel demand generated by the traffic zones interacts with the supply, provided by the regional transportation network. All trips from all zones are assigned along the network to all their destination zones. The equilibrium assignment procedure is used in this model. The equilibrium method essentially assumes that a person will continue to shift his path until there is no quicker path available. The time for each path is calculated based on capacity, congestion and speed on each link that makes up a path.

Once a model produces traffic volumes, it must be calibrated. Calibration refers to the adjusting of various model factors and components - and running the model again, until it replicates current travel patterns and traffic volumes at acceptable levels of accuracy. Often adjustments and subsequent model runs must be conducted many times before an accurate result is reached. Once the model is calibrated to current conditions, it can then be used to forecast future scenarios.

4.1.2 Travel Demand Model Inputs

PVPC and FRCOG model runs were received for the 1997, 2003, 2010, 2020, and 2025 planning horizons. The TransCAD models from the PVPC and FRCOG were received, merged, and checked for calibration/accuracy. Consultation with PVPC staff indicated that an extensive calibration effort was completed for the 1997 model. Therefore, the 1997 model was used as the base condition for the study area forecast.

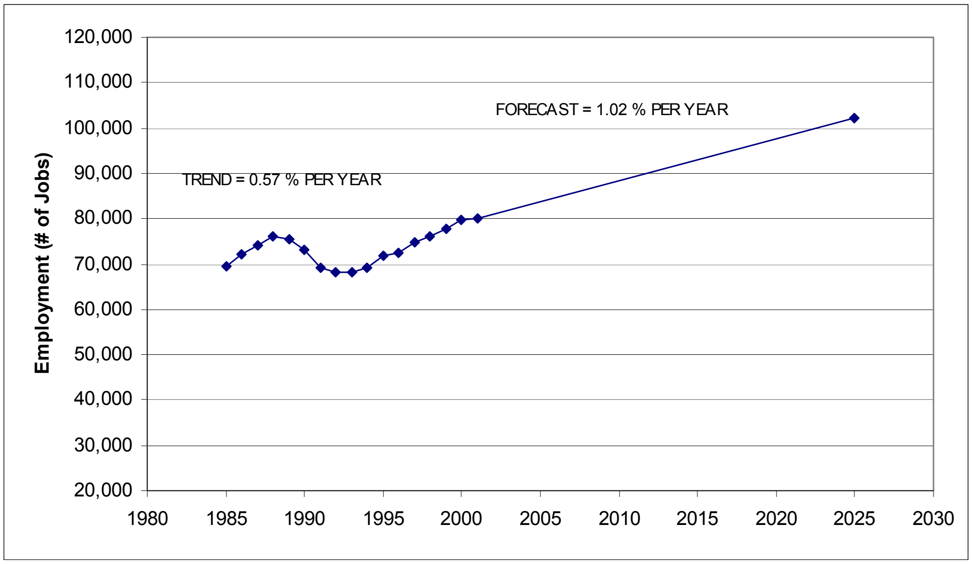
As noted previously, the key demographic inputs that have the most influence on the regional model are household and employment growth. Upon reviewing the assumed growth for each community in the study area for the year 2025, the study advisory group requested a more detailed analysis of the employment and household growth estimates inherent in the model. The goal was to have land use inputs that more closely reflected each community's planned growth. In addition, because of recent planning work completed in response to Executive Order 418, more detailed land use based growth estimates for many cities and towns in the state are now available. These build-out analyses were therefore used to fine-tune the growth estimates in the regional model.

The first step was to identify the communities where the employment and household growth trend in the 2025 model was either too high or too low. A review of the model’s growth compared to historical and planned trends helped identify these areas. Adjustments were made to these socio-economic inputs based on feedback from the advisory group, a review of past and planned trends, and review of growth forecasts from each community supplied by town planning officials. The final step was to present the proposed changes to the PVPC, the FRCOG, and to the study advisory group for feedback. The following sections detail the adjustments made to the employment and household forecasts and input into the regional travel demand forecast model.

Employment Growth Calibration

The employment growth forecast in the PVPC regional model is based on the Regional Economic Model Incorporated (REMI) employment forecast while the employment forecast in the FRCOG regional model is based on the historical growth between the 1990 and 1998 DET employment values. As mentioned previously the study area model includes the PVPC regional model as well as parts of the FRCOG regional model. A comparison of the employment forecast in the study area model to the employment trend from the Department of Employment and Training (DET) is depicted on Figure 4-1.

Figure 4-1
Study Area Employment Trend and Forecast to 2025



Source: Department of Employment and Training Data (1985 to 2001)

As indicated in Figure 4-1, the model forecast suggests a higher rate of growth than the past trend. From 1985 to 2001, job growth in the study area grew by an average of 0.57 percent per year. There was a steady loss of jobs from 1986 to 1992 followed by a period of job growth from 1992 on. The model's forecast suggests an average growth of 1.02 percent per year.

After reviewing the job growth projected for each study area community, it was determined that the forecasts for Northampton, Amherst, and Belchertown needed to be adjusted. Table 4-1 summarizes the adjustments that were made to employment growth in the model for Northampton, Amherst, and Belchertown.

- Northampton – The employment growth forecast for Northampton was viewed as being high and more reflective of an unconstrained build out for the city. From 2001 to 2025, the model originally forecast an additional 7,280 jobs – representing a growth of 41 percent from today. This forecast also shows a disproportionate growth in jobs compared to household and population growth estimates for Northampton. Based on forecasts from the Northampton Office of Planning and Development and a review of household-to-employment ratios for the city, the model was adjusted such that the job growth was dampened to show an additional 1,790 jobs from today to year 2025, representing a 10 percent increase. This reduction in employment growth was determined after consultation with Northampton planning officials and a review of the Executive Order 418 build-out analysis for Northampton. The redevelopment of the former State Hospital and growth on Damon Road at the Northampton Industrial Park were assumed to be the key growth nodes.

- Amherst – The employment growth for Amherst from 2001 to 2025 was decreased from 4,850 jobs (a 37 percent increase) to 3,510 jobs (a 27 percent increase). This adjustment was based on a detailed land use analysis for the town of Amherst that was also prepared as part of Executive Order 418. Amherst planning officials were also consulted.

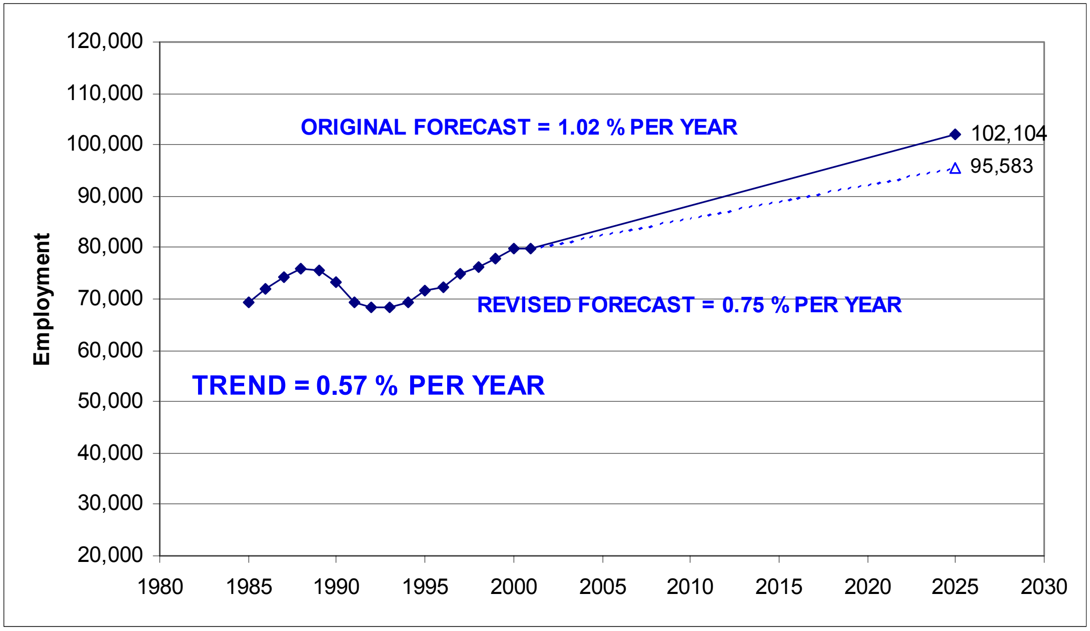
- Belchertown – The employment growth was increased from 240 jobs to 540 jobs because the town has experienced a growth surge in recent years. Input was also provided by planning officials from Belchertown.

Table 4-1
Employment Growth Forecast Changes
2001 to 2025

Community	2001 Employment	Unadjusted 2025 Employment	2001 TO 2025 Unadjusted Growth		Adjusted 2025 Employment	2001 TO 2025 Adjusted Growth	
	# JOBS	# JOBS	# JOBS	Pct.	# JOBS	# JOBS	Pct.
Northampton	**17,750**	25,030	7,280	41%	**19,540**	**1,790**	**10%**
Amherst	**13,040**	17,890	4,850	37%	**16,550**	**3,510**	**27%**
Belchertown	**2,010**	2,250	240	12%	**2,550**	**540**	**27%**
STUDY AREA TOTAL	**32,800**	45,170	12,370	38%	**38,640**	**5,840**	**18%**

For the entire study area, the employment growth in the regional travel demand model from 2001 to 2025 was reduced from 12,370 jobs (38 percent growth) to 5,840 jobs (18 percent growth) based on outreach and calibration efforts with several communities. On an annual basis, the adjusted employment growth would represent an average growth of 0.75 percent per year, slightly higher than the past trend of 0.57 percent per year. This adjustment is depicted on Figure 4-2.

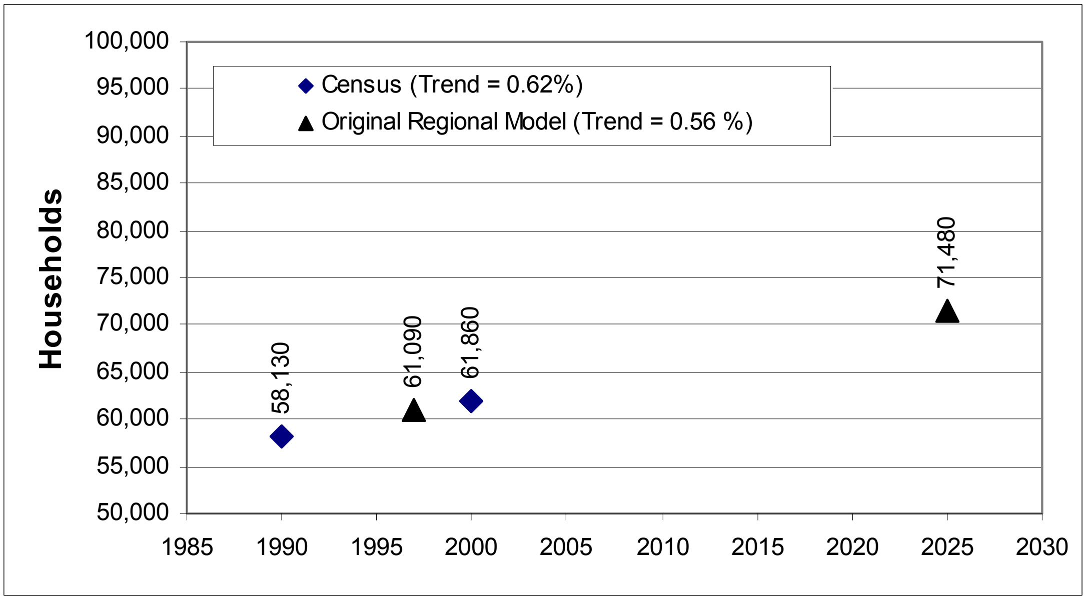
Figure 4-2
Study Area Employment Trend and Adjusted Forecast to 2025



Household Growth Calibration

The household growth forecast is based on the Massachusetts Institute for Social and Economic Research (MISER) model. MISER uses census data and other demographic inputs to estimate changes in the number of households for a particular region. A comparison of the household growth forecast in the regional model to the 1990 and 2000 census is shown on Figure 4-3.

Figure 4-3
Study Area Household Growth Trend and Forecast to 2025



The overall growth projected for the region appeared reasonable. The growth in households from 1997 to 2025 (0.62 percent per year) is similar to the trend of 0.56 percent growth per year from 1990 to 2000. Based on feedback from the study advisory group and from local planners, however, several community-level adjustments were necessary. Specifically, growth estimates for Amherst, Easthampton, Hadley, and Belchertown required adjustments. The adjustments that were applied are described below and summarized in Table 4-2.

- Amherst – The unadjusted forecast suggested a growth of 7,090 households in Amherst from 2000 to 2025, representing a 77 percent increase. This growth estimate was much higher than past and planned trends in Amherst. After consultation with the Amherst planning department, the increase in the number of households was decreased to 3,830. The adjusted forecast of 13,000 households in 2025 results in a 42 percent increase in households from the year 2000.

- Easthampton – Based on estimates provided by Easthampton planning officials, the forecast was changed to reflect an increase of 990 households from 2000 to 2025.

- Hadley – The household growth was adjusted to more appropriately reflect current trends. The original model suggested a decline in households from 2002 to 2025. The adjusted model would suggest 380 households would be added between 2000 and 2025.

- Belchertown –The original model forecast for Belchertown was increased to indicate a growth of 2,030 households from 2000 to 2025 based on historic trends and current estimates from town officials.

Table 4-2
Household Growth Forecast Changes
2000 to 2025

Community	2000 Households	Unadjusted 2025 Households	2000 TO 2025 Unadjusted Growth		Adjusted 2025 Households	2000 TO 2025 Adjusted Growth	
	# HHOLDS	# HHOLDS	# HHOLDS	Pct.	# HHOLDS	# HHOLDS	Pct.
Amherst	9,170	16,260	7,090	77%	13,000	3,830	42%
Easthampton	6,850	6,220	-630	-9%	7,840	990	14%
Hadley	1,900	1,670	-230	-12%	2,280	380	20%
Belchertown	4,890	5,670	780	16%	6,920	2,030	42%
STUDY AREA TOTAL	61,680	71,480	9,800	16%	71,700	10,020	16%

For the entire study area, the adjusted population growth was an additional 10,020 households (16 percent) from 2000 to 2025. Although the aggregate changes in household growth (9,800 vs. 10,020) did not change significantly, the specific increases/decreases to individual communities do affect trip distribution patterns within the model.

4.1.3 Travel Demand Model Outputs

As described earlier the population and employment inputs are two of the major inputs to the travel demand model process. They help to determine how much growth there will be on study area roadways. The 1997 model link volumes were compared to the 2025 link volumes in order to determine the yearly growth in volume on key study area roadways given the future land use projections and planned infrastructure. The annual growth calculated by the model volumes was applied to existing traffic counts to calculate 2025 roadway link volumes and turning movements at key intersections. The following describes the information needed to calculate future link volumes and turning movements:

- 2002 counts at all study area intersections and major roadway links
- 1997 Model output (volumes) for all approaches to the study area intersections as well as major roadway links
- 2025 Model output (volumes) for all approaches to the study area intersections as well as major roadway links

The 2025 volumes are based on the 2025 baseline model condition, which predicts how the transportation infrastructure handles projected traffic demand assuming no improvements beyond those that are already programmed in the regions. Table 4-3 summarizes the major infrastructure improvements that are included in the travel demand model and therefore included in the "2025 Baseline Condition."

The model was also used to estimate expected changes in vehicle-miles traveled (VMT) and vehicle-hours traveled (VHT) for the study area. VMT is an indicator of trip lengths for all trips in the study area. One vehicle traveling one mile constitutes one vehicle-mile. Adding the vehicle-miles traveled for every trip that occurs results in an estimate of total VMT for the study area. VHT is an indicator of trip times. Similar to VMT, one vehicle traveling one hour constitutes one vehicle-hour. VHT for the study area is a sum of the vehicle-hours traveled for every trip. VMT and VHT are important factors that are used to evaluate the effectiveness of alternatives in meeting regional mobility and efficiency goals for vehicular travel. VMT and VHT are also indicators of potential air quality benefits or impacts associated with improvements.

Table 4-3
Major Infrastructure Improvements Assumed in the Model
2001 to 2025

MODEL ANALYSIS YEAR	COMMUNITY	PROJECT DESCRIPTION
2003	Hadley, Northampton	Coolidge Bridge widening
2003	Hadley	Route 9 widening to 4 lanes from Coolidge Bridge to West Street
2003	Hadley	Route 9 signal coordination
2010	Northampton	Roadway widening on Damon Road from Route 9 to King Street

Source: Pioneer Valley Planning Commission

4.1.4 Summary

As the travel demand forecast is only as good as the inputs that comprise the forecast, an extensive model calibration effort was undertaken to ensure that the baseline analysis for 2025 conditions reflects a realistic estimate of traffic demand growth. Specifically, significant time was spent soliciting information from planning officials from each city/town in the study area where growth estimates in the model needed adjusting. The resulting changes in employment and household inputs helped to fine-tune the model for 2025 conditions which will assist in identifying transportation deficiencies and needs for the region in the year 2025.

4.2 Future Traffic Volumes – Year 2025

This section compares the 2002 and 2025 volumes on the three Connecticut River bridges and on key highways in the study area. VMT and VHT for the study area are also compared for 2002 and 2025 conditions to show the growth expected to occur.

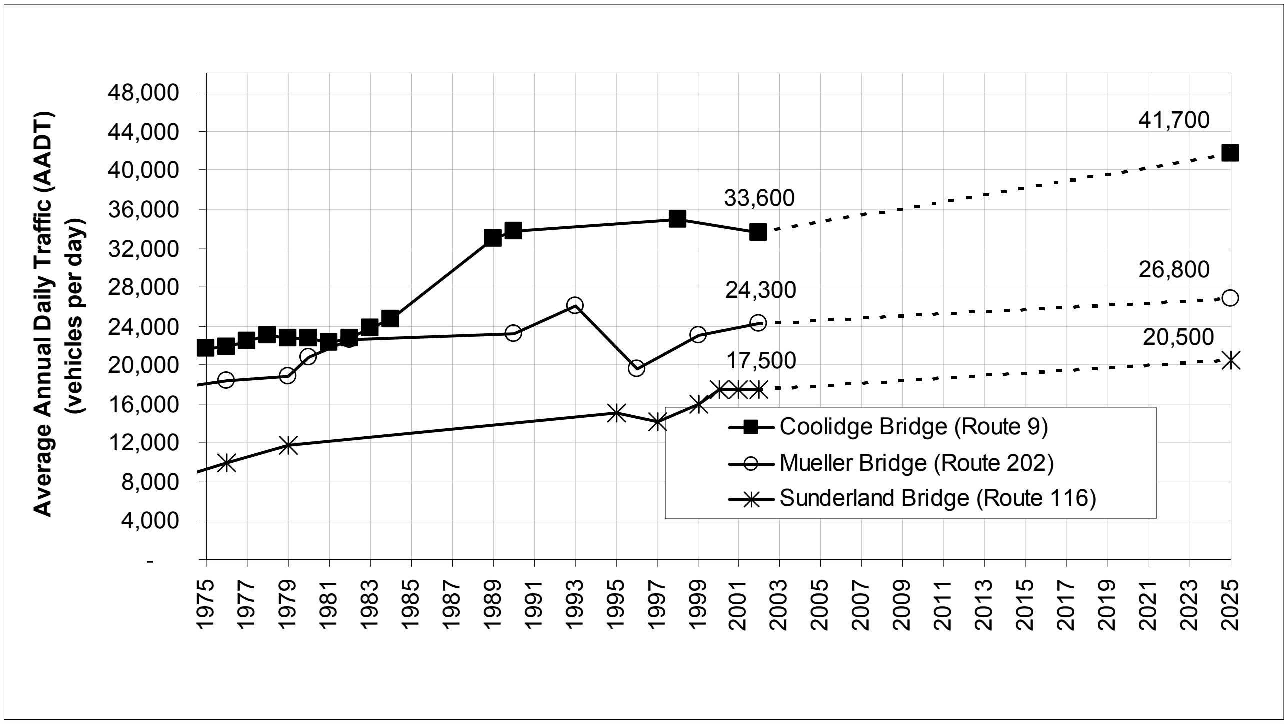
4.2.1 Growth on Area Bridges

The volumes and growth rates for the bridges are provided in Table 4-4. Figure 4-4 depicts the difference between the 2002 and 2025 bridge crossing volumes from the regional model.

Table 4-4
Average Daily Traffic Volume (ADT) Comparison for Bridge Crossings 2002 to 2025

Connecticut River Bridge	2002 ADT	2025 ADT	% change (2002 to 2025)	Average yearly % change (2002 to 2025)
Route 202 (Mueller Bridge) – South Hadley	24,300	26,800	10 %	0.43 %
Route 9 (Coolidge Bridge) – Hadley	33,600	41,700	24 %	0.94 %
Route 116 (Sunderland Bridge) - Sunderland	17,500	20,500	17 %	0.70 %

Figure 4-4
Forecasted Bridge Crossing Volumes



Of the three crossings in the study area, the highest growth rate is projected to occur on the Coolidge Bridge. From 2002 to 2025, traffic on the Coolidge Bridge is forecast to grow by 24 percent, or approximately 0.94 percent annually. A 17 percent increase in traffic is forecast for the Sunderland Bridge (0.70 percent annually) and a 10 percent increase is forecast on the Mueller Bridge (0.43 percent annually).

4.2.2 Growth on Key Highways

Table 4-5 provides a comparison of the volumes on key highways in the study area for 2002 and 2025 conditions from the regional model.

Table 4-5
Average Daily Traffic Volume (ADT) Comparison for Key Study Area Highways
2002 to 2025

Segment	2002 ADT	2025 ADT	% Change (2002 to 2025)	Average yearly % change (2002 to 2025)
Route 5/10 Northampton North of Damon Road	21,200	29,100	37 %	1.37 %
Damon Road	19,300	24,000	24 %	0.96 %
Route 9 Hadley East of Bay Road	28,800	35,000	22 %	0.84 %
Route 116 Hadley North of Route 9	8,100	10,000	23 %	0.92 %
I-91 Between Interchanges 23 and 24	33,300	40,400	21 %	0.84 %

As shown in Table 4-5, growth in the study area varies depending on the roadway location. Generally, the model forecast shows increases in these segments ranging from 21 percent to 37 percent from 2002 to 2025. Traffic on the segment of Route 5/10 in Northampton north of Damon Road is forecast to increase by 37 percent from 2002 to 2025, or 1.37 percent annually. Damon Road in Northampton is forecast to carry 24 percent more traffic in 2025 – an increase of 0.96 percent annually.

4.2.3 VMT/VHT Growth

In addition to the growth on the three Connecticut River crossings and on key highways in the study area, extracting vehicle-miles traveled (VMT) and vehicle-hours traveled (VHT) changes from the 2025 model gives further insight about expected study area growth. As noted previously, 1997 was the base model year used to calculate growth rates for the study area intersections, bridges, and key roadway segments. This approach was also used to quantify changes in VMT and VHT.

A VMT reduction over time indicates either fewer vehicular trips, shorter trip lengths, or both, for all trips occurring in the study area. A VHT reduction indicates either fewer vehicular trips, faster trip times, or both. Conversely, increases in either VMT or VHT indicate more trips, longer trip lengths, slower trip times, or any combination of these factors. It is possible for an alternative to result in an increase in VMT with a corresponding decrease in VHT. For example, an alternative that provides a longer trip distance but bypasses congested areas could result in a VMT increase and VHT decrease.

Table 4-6 summarizes the changes in VMT and VHT between 2002 and the 2025 model forecast.

Table 4-6
Vehicle-Miles Traveled (VMT) and Vehicle-Hours Traveled (VHT) Comparison 2002 to 2025 Baseline Conditions

	2002	2025	% change (2002 to 2025)	Average yearly % change (2002 to 2025)
VMT	2,780,000	3,189,900	15%	0.60 %
VHT	75,400	88,200	17%	0.68 %

From 2002 to 2025, the study area VMT is forecast to grow by 15 percent – an increase of 0.60 percent annually. The study area VHT is forecast to grow by 17 percent or 0.68 percent annually from 2002 to 2025. Since the VHT is forecast to grow at a slightly higher rate than VMT, it is likely that increased congestion is resulting in delays and slower trip times.

4.3 Future Traffic Operations – Year 2025 Baseline Conditions

The future LOS analyses provide a "snapshot" of the peak hour conditions given the projected traffic volumes. The model used for the forecast accounts for capacity constraints where congestion results in motorists changing their travel patterns.

The procedures and criteria used to evaluate the future conditions were based on the methods presented in the 2000 Highway Capacity Manual (HCM)[1], consistent with the analyses completed for the existing conditions. The HCM presents various methods for evaluating traffic operations for different types of roadway facilities based on years of research into traffic operations and traffic flow. Level of service (LOS) is the qualitative designation used to describe operations. A detailed description of the LOS method is provided in Chapter 2. The following sections provide a summary of the future conditions for the study area intersections.

The results of the intersection analyses under 2025 Baseline Conditions are summarized in Table 4-7 for signalized intersections and Table 4-8 for unsignalized intersections. These results are presented graphically in Figure 4–5. The tables and figures show the intersections that were evaluated for the existing morning and evening peak hour levels of service. To reiterate, the capacity analyses reflect the infrastructure improvements for the study area that are included in the model.

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[1] Highway Capacity Manual (HCM), Transportation Research Board Special Report 209, Washington, D.C., 2000

Comparing the 2002 Existing conditions to the 2025 Baseline Conditions analyses indicates that most study area intersections are expected to handle more traffic, thus resulting in a deteriorated LOS rating. However, there are several locations where infrastructure improvements are expected to improve the LOS from 2002 to 2025. Specifically, improvements are expected to occur (on at least one approach) at the following locations:

- Route 10 at Route 141 (Easthampton);
- Route 9 at Damon Road/I-91 NB off-ramp (Northampton);
- Damon Road/Bridge Road at Route 5/10 (Northampton);
- Route 9 at Bay Road (Hadley); and
- I-91 southbound on-ramp (Exit 19) at Route 9 (Northampton).

Signalized Intersections

Under future 2025 conditions, the following signalized intersections are projected to operate at LOS E/F for one or more intersection approaches during morning or evening peak hour conditions:

- **Route 10 at Route 141 (Easthampton) –** Planned signal upgrades at this intersection improve the overall operations from LOS F under existing conditions to LOS E under 2025 base conditions. In the evening peak hour under 2025 Baseline Conditions, the Route 10 northbound approach degrades to LOS E as a result of traffic volume increase.
- **I-91 Northbound Ramps (Exit 18) at Route 5/10 (Northampton) –** Heavy southbound traffic volume on Route 5/10 results in LOS E operations in the evening peak hour.
- **Route 9 at Damon Road/I-91 Northbound off-ramp (Northampton) –** Traffic increases on Route 9, Damon Road, and the I-91 off-ramp result in LOS E or F conditions. These LOS deficiencies are expected to occur in both morning and evening peak hour conditions.
- **Damon Road/Bridge Road at Route 5/10 (Northampton) –** Traffic increases on Damon Road and on Route 5/10 result in LOS F conditions under 2025 Baseline Conditions during both morning and evening peak hour periods.
- **Route 9 at Route 47 (Hadley) –** LOS F conditions occur in both morning and evening peak hour periods along Route 9.
- **Route 9 at Route 116 (Hadley) –** In the morning, LOS F conditions occur on Route 9 eastbound and LOS E conditions occur on Route 116 southbound. In the evening, LOS F conditions occur on Route 116 southbound and LOS E conditions occur on Route 9 eastbound. These conditions are attributable to growth along the Route 9 and Route 116 corridors.
- **Route 9 at Route 116 (Amherst) –** Similar to the existing conditions analysis, LOS F conditions occur during the morning and evening peak periods under 2025 Baseline Conditions.

- **Route 116 at Route 47 (Sunderland) –** Route 47 northbound is expected to operate at LOS F under future 2025 Baseline Conditions. Route 116 westbound is expected to operate at LOS E.
- **Route 116 at Sugarloaf Street (Deerfield) –** The southbound approach to Sugarloaf Street is expected to operate at LOS F under 2025 Baseline conditions.

Five of the ten signalized intersections with operational deficiencies are located along the segment of Route 9 between I-91 and Amherst Center. From 2002 to 2025, traffic on this corridor is expected to increase by approximately 22 percent, exacerbating the LOS and capacity deficiencies that occur even without the traffic increases under 2002 conditions.

Table 4-7
Signalized Intersection Level-of-Service Comparison
2002 Existing vs. 2025 Future Baseline Conditions

		2002 Existing Conditions LOS[1]		2025 Baseline Condition LOS	
Signalized Intersections	**Time Period**	**AM PEAK**	**PM PEAK**	**AM PEAK**	**PM PEAK**
Route 10 at Route 141 Easthampton[1]	**Overall**	**F**	**F**	**E**	**E**
	Route 10 Northbound	B	B	**E**	**E**
	Route 10 Southbound	**F**	**F**	**E**	**E**
	Route 141 Westbound	D	**F**	D	**E**
Route 5/10 at Route 141/I-91 Exit 17 Off-ramps Holyoke	Overall	C	C	C	D
	Route 141 Eastbound	D	D	D	D
	Northbound Route 5	B	C	C	D
	Southbound Route 5	B	B	B	C
Route 5/10 at route 141/I-91 Exit 17 On-ramps Holyoke	Overall	C	C	C	C
	Route 141 Westbound	C	C	D	C
	Northbound Route 5	A	B	B	B
	Southbound Route 5	B	B	C	B
I-91 NB ramps (exit 18) at Route 5/10 Northampton	Overall	B	C	C	D
	Eastbound Exit 18 Ramp	B	C	B	D
	Northbound Route 5/10	B	C	D	D
	Southbound Route 5/10	B	C	B	**E**
Route 9 at Damon Road/I-91 NB off-ramp[2,3] Northampton	**Overall**	C	D	**D**	**F**
	Route 9 Eastbound	C	C	C	D
	Route 9 Westbound	C	D	**E**	**F**
	I-91 northbound off-ramp	D	**E**	**E**	**E**
	Damon Road Southbound	D	E	**D**	D
Damon Road /Bridge Road at Route 5/10 (N. King Street) Northampton	**Overall**	**E**	**F**	D	**F**
	Eastbound Bridge Road	**F**	**F**	D	D
	Westbound Damon Road	D	**F**	D	**E**
	Northbound N. King Street	**F**	**F**	**E**	**F**
	Southbound N. King Street	D	D	D	**E**
Route 9 at Bay Road Hadley[2,3]	**Overall**	**D**	**C**	B	B
	Eastbound Route 9	**E**	C	B	B
	Westbound Route 9	**D**	**C**	B	B
	Northbound Bay Road	D	C	C	C
Route 9 at Route 47 Hadley	**Overall**	C	**E**	**F**	**F**
	Eastbound Route 9	D	C	**F**	**F**
	Westbound Route 9	C	**F**	**E**	**F**
	Northbound Route 47	C	C	C	C
	Southbound Route 47	C	C	C	C
Route 9 at Route 116 Hadley	Overall	D	C	**F**	D
	Route 9 Eastbound	**E**	C	**F**	**E**
	Route 9 Westbound	B	C	B	C
	Westgate Drive Northbound	C	C	C	C
	Route 116 Southbound	D	D	**E**	**F**

1. Level of Service
2. Existing 2002 analyses reflect conditions without lane restrictions from the Coolidge Bridge Reconstruction.
3 Future 2025 analyses reflect improved operations from infrastructure improvements included in the model.
Note: Locations in bold denote LOS E or F conditions during one or both peak periods for the 2025 Base Condition.

Table 4-7 (continued)
Signalized Intersection Level-of-Service Comparison
2002 Existing vs. 2025 Future Baseline Conditions

		2002 Existing Conditions LOS*		2025 Baseline Condition LOS	
Signalized Intersections	Time Period	AM PEAK	PM PEAK	AM PEAK	PM PEAK
Route 9 at Route 116	**Overall**	**F**	**F**	**F**	**E**
Amherst	**Route 9/116 Eastbound**	**F**	**F**	**F**	**E**
	College Street Westbound	**F**	**F**	**F**	**F**
	S. Pleasant Street Northbound	C	C	C	C
	N. Pleasant Street Southbound	C	C	C	C
Route 116 at Route 47	**Overall**	B	B	D	**E**
Sunderland	Route 116 Eastbound	B	B	D	D
	Route 116 Westbound	A	B	A	**E**
	Route 47 Northbound	C	C	**F**	**F**
	Route 47 Southbound	B	B	C	C
Route 116 at Sugarloaf Street	Overall	B	B	D	D
Deerfield	Eastbound Route 116	A	A	B	B
	Westbound Route 116	C	C	**E**	D
	Northbound Sugarloaf Street	B	A	B	B
	Southbound Sugarloaf Street	B	B	**F**	**F**
Route 116 at Route 5/10	Overall	B	B	C	C
Whately	Westbound Route 116	B	B	C	C
	Northbound Route 5	B	A	B	B
	Southbound Route 5	A	A	D	C

1. Level of Service
2. Existing 2002 analyses reflect conditions without lane restrictions from the Coolidge Bridge Reconstruction.
3 Future 2025 analyses reflect improved operations from infrastructure improvements included in the model.
Note: Locations in bold denote LOS E or F conditions during one or both peak periods for the 2025 Base Condition.

Unsignalized Intersections

Under future 2025 Baseline Conditions, the following unsignalized intersections are projected to operate at LOS E/F for overall intersection operations during at least one peak hour:

- I-91 Southbound Ramps (Exit 18) at Route 5 (Northampton)
- I-91 Southbound Ramps (Exit 19) at Route 9 (Northampton)
- I-91 Southbound Ramps (Exit 21) at Route 5/10 (Northampton)
- I-91 Northbound Ramps (Exit 21) at Elm Street (Northampton)
- Elm Street at Route 5/10 (Northampton)
- Damon Road at Industrial Drive (Northampton)
- Route 116 at Bay Road (Amherst)
- I-91 Northbound off-ramp (Exit 24) at Route 5/10 (Whately)
- Route 202 (Lincoln Street) at Route 5 (Holyoke)
- Route 116 at Route 202 westbound ramps (South Hadley)
- Route 116 at Route 47 (South Hadley)

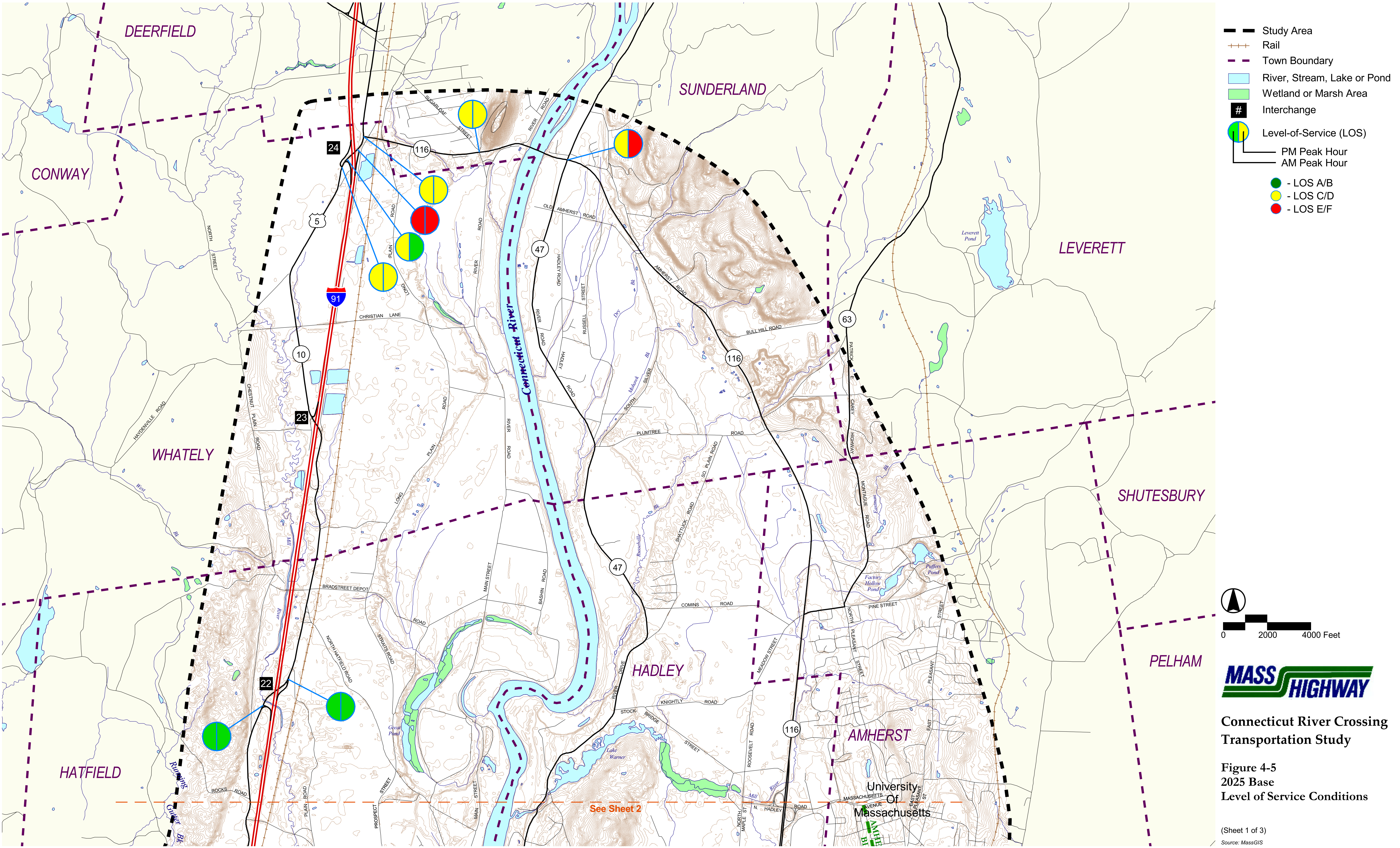
During the evaluation of alternatives, TSM type improvements such as traffic signal installation, will be investigated at these unsignalized intersections. Capacity enhancing improvements, such as geometric changes, will also be investigated. Shifts in demands that would occur from other remote improvements may help resolve several of these deficiencies by diverting demands away from the problem location.

Table 4-8
Unsignalized Intersection Level-of-Service Comparison
2002 Existing vs. 2025 Future Baseline Conditions

		2002 Existing Conditions LOS[1]		2025 Baseline Condition LOS	
Unsignalized Intersections	**Location**	**AM PEAK**	**PM PEAK**	**AM PEAK**	**PM PEAK**
I-91 SB ramps (exit 18) at Route 5	**Northampton**	C	**E**	C	**F**
I-91 SB on-ramp (exit 19) at Route 9[2]	**Northampton**	C	C	**F**	**E**
I-91 SB ramps (exit 21) at Route 5/10	**Northampton**	C	D	C	**F**
I-91 NB ramps (exit 21) at Elm Street	**Northampton**	B	C	C	**E**
Elm Street at Route 5/10	**Northampton**	C	**E**	D	**F**
Damon Road at Industrial Drive	**Northampton**	**E**	**F**	**F**	**F**
Route 116 at Bay Road (east)	**Amherst**	B	C	C	**E**
Route 116 at West Bay Road (west)	**Amherst**	C	C	**E**	**F**
I-91 NB off-ramp (exit 22) at Route 5/10	Hatfield	A	B	B	B
I-91 SB on-ramp (exit 22) at Route 5/10	Hatfield	A	A	A	A
I-91 SB on-ramp (exit 24) at Route 5/10	Whately	B	A	C	B
I-91 SB off-ramp (exit 24) at Route 5/10	Whately	B	B	D	C
I-91 NB off-ramp (exit 24) at Route 5/10	**Whately**	C	C	**F**	**F**
Route 202 (Lincoln Street) at Route 5	**Holyoke**	C	C	**F**	**F**
Route 202 Mueller Bridge U-Turn	Holyoke	B	B	B	C
Route 116 at Route 202 WB ramps	**South Hadley**	C	C	D	**E**
Route 116 at Route 202 EB ramps	South Hadley	B	B	B	B
Route 116 at Route 47	**South Hadley**	D	**E**	**F**	**F**

1. Level of Service
2. Existing 2002 analyses reflect conditions without lane restrictions from the Coolidge Bridge Reconstruction.

Note: Locations in bold denote LOS E or F conditions during one or both peak periods for the 2025 Base Condition.



Connecticut River Crossing Transportation Study

Figure 4-5
2025 Base
Level of Service Conditions

(Sheet 1 of 3)

Source: MassGIS

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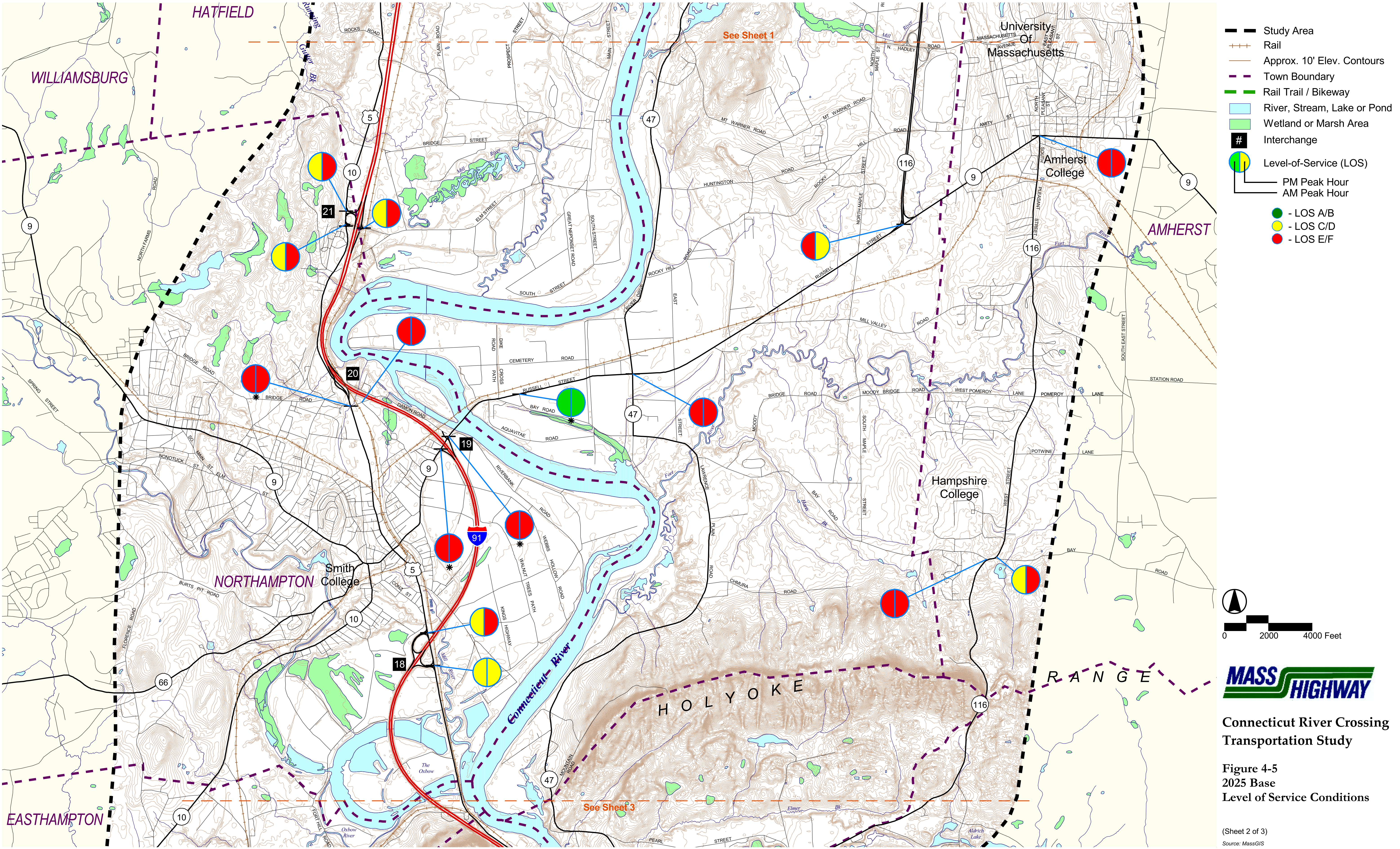
*Analysis reflects infrastructure improvements included in the model.



Connecticut River Crossing Transportation Study

Figure 4-5
2025 Base
Level of Service Conditions

(Sheet 2 of 3)

Source: MassGIS

*Analysis reflects infrastructure improvements included in the model.

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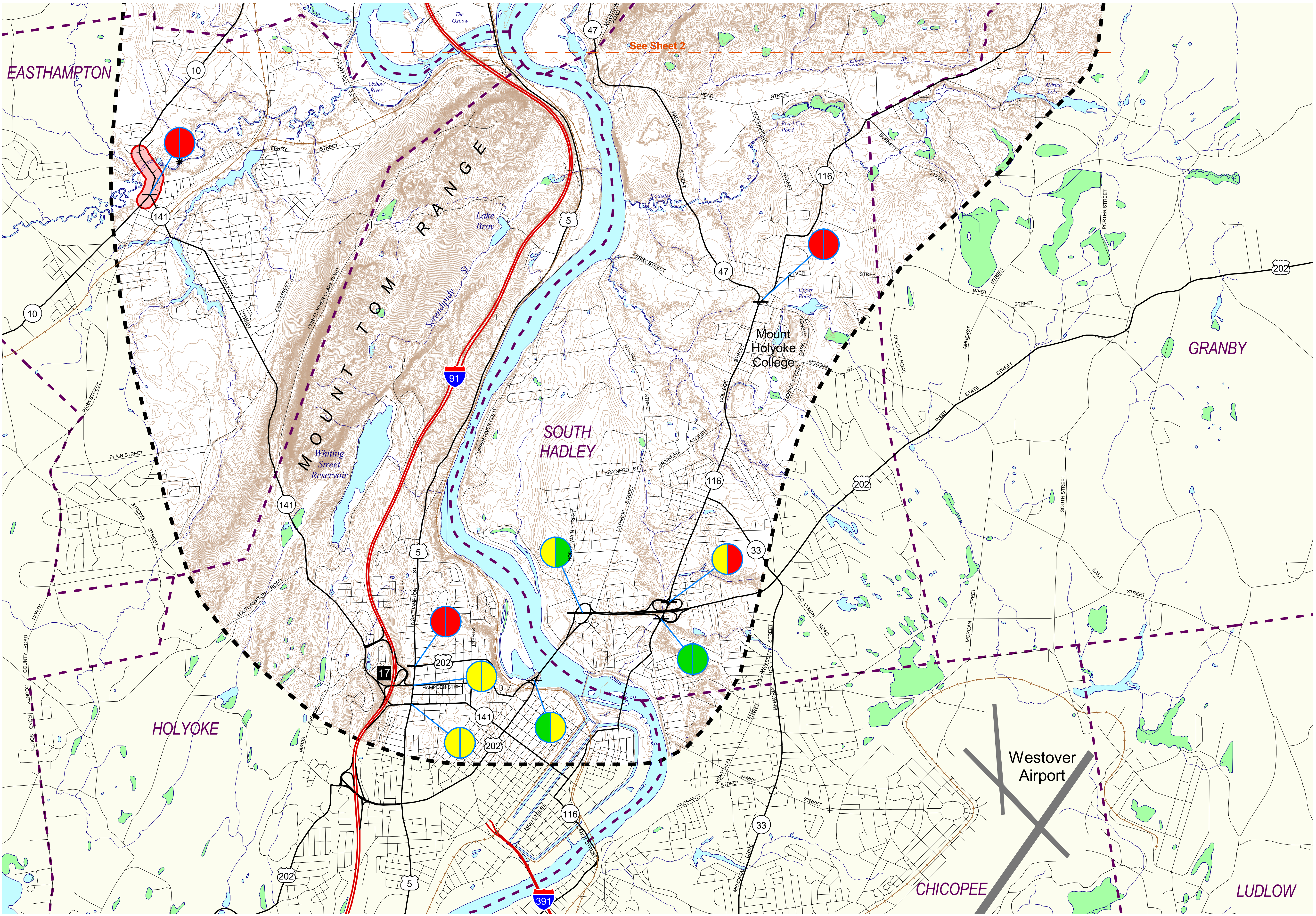


MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 4-5
2025 Base
Level of Service Conditions

(Sheet 3 of 3)

Source: MassGIS

Graphic File: \\Mawatr\GIS\08036\PS-PDF\2025-Fig4-5-3.pdf
Application Source: \\Mawatr\GIS\08036\Apr-MXD\ct_river_crossing_3.apr

* *Analysis reflects infrastructure improvements included in the model.*

4.4 Summary of Future Transportation Conditions

This chapter presented the future baseline transportation conditions within the study area. Many of the existing problems and issues presented in Chapter 2 worsen under 2025 traffic volumes as traffic demands increase. Several study area intersections degrade to LOS E/F levels under 2025 conditions. The traffic volume and VMT/VHT changes from 2002 to 2025, and the future operating deficiencies are summarized below.

Traffic Volumes

Of the three crossings in the study area, the highest growth occurs on the Coolidge Bridge where from 2002 to 2025, traffic on the Coolidge Bridge is forecast to grow by 24 percent, or approximately 0.94 percent annually. A 17 percent increase in traffic is forecast for the Sunderland Bridge (0.70 percent annually) and a 10 percent increase is forecast on the Mueller Bridge (0.43 percent annually).

VMT/VHT

From 2002 to 2025, the study area VMT is forecast to grow by 14 percent – an increase of 0.57 percent annually. The study area VHT is forecast to grow by 15 percent or 0.63 percent annually from 2002 to 2025. Since the VHT is forecast to grow at a slightly higher rate than VMT, it is likely that increased congestion is resulting in longer delays and slower trip times.

Traffic Operations

The future traffic operations analyses reinforces many of the conclusions from the existing transportation assessment in Chapter 2. Although there are several intersection level deficiencies throughout the study area, the area experiencing corridor-level operational problems where many adjacent intersections are at or near capacity is along Route 9 from I-91 to Amherst Center.

5.0 Alternatives Development

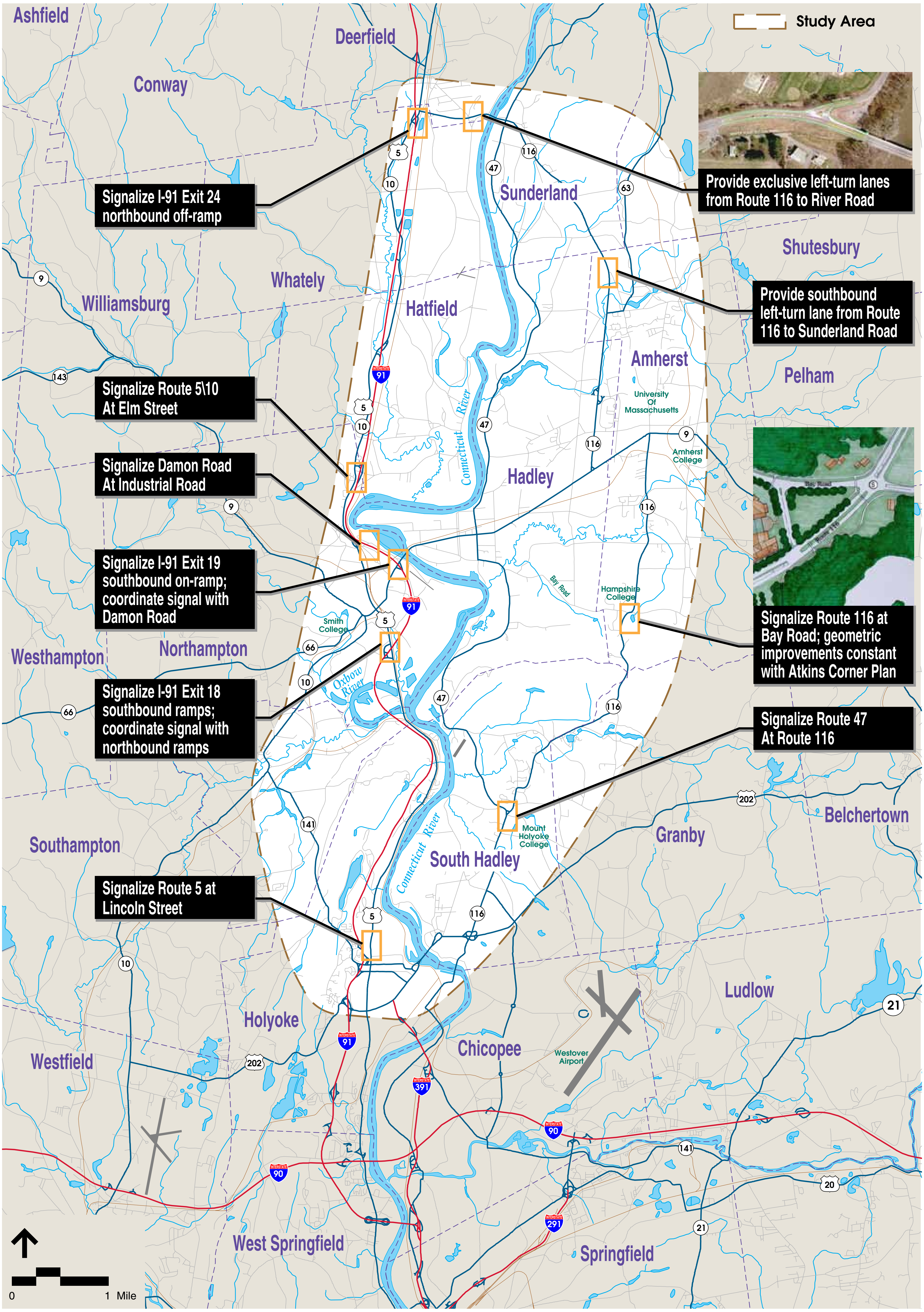
The analysis of existing and future transportation conditions in the study area identified areas of the transportation network that require improvements, either infrastructure or system management improvements. Through interaction with the Study Advisory Group, research on planned improvements already on the Transportation Improvement Program (TIP), and outreach with local planning officials, a range of transportation improvements were identified for this study. This chapter summarizes the range of alternatives considered for the study. Chapter 6 – Alternatives Analysis – presents the analysis assumptions, procedures, and results of the alternatives screening.

During early 2003, VHB and MassHighway representatives met with local planning officials throughout the project study area to solicit ideas for transportation system improvements. These ideas were then presented to the Study Advisory Group for review and comment during a "working session" focused on alternatives. The working session also provided new ideas and commentary from the Advisory Group on the future transportation needs. The range of alternatives identified included:

- Transportation System Management (TSM) Actions – new traffic signals, signal coordination, signal timing/phasing changes, lane assignment changes, etc;
- Infrastructure Improvements – including major changes to existing roadways such as new ramps, roadway widening, and roundabouts/rotaries;
- New River Crossings – consideration of new bridge connections across the Connecticut River; and
- Transportation Demand Management (TDM) Strategies – transit improvements, car ferry service, consideration of Park and Ride Lots, or projects involving Intelligent Transportation Systems (ITS) technology.

5.1 Transportation System Management Improvements

The transportation system management (TSM) improvements were focused on lower-cost actions that address identified deficiencies. These TSM options, such as lane restriping, providing new traffic signals, or upgrading existing signals actions do not involve significant infrastructure alterations or major environmental impacts. A total of nine TSM concepts were studied. The TSM concepts are depicted on Figure 5-1.



Signalize I-91 Exit 24 northbound off-ramp

Provide exclusive left-turn lanes from Route 116 to River Road

Provide southbound left-turn lane from Route 116 to Sunderland Road

Signalize Route 5\10 At Elm Street

Signalize Damon Road At Industrial Road

Signalize I-91 Exit 19 southbound on-ramp; coordinate signal with Damon Road

Signalize Route 116 at Bay Road; geometric improvements constant with Atkins Corner Plan

Signalize I-91 Exit 18 southbound ramps; coordinate signal with northbound ramps

Signalize Route 47 At Route 116

Signalize Route 5 at Lincoln Street

MASS HIGHWAY

Connecticut River Crossing
Transportation Study

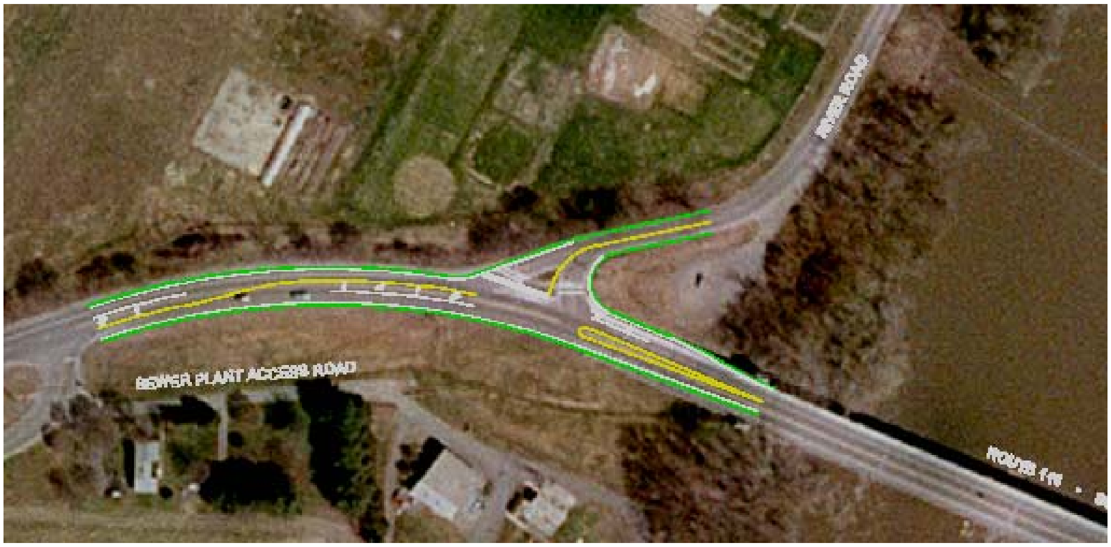
Figure 5-1
Candidate TSM Improvements

■

Concept 1 - Route 116/River Road Improvements (Deerfield)

Just west of the Sunderland Bridge in Deerfield, River Road intersects Route 116 at two adjacent unsignalized intersections. Concept 1 involves restriping Route 116 between the River Road intersections so that exclusive left-turn lanes are provided onto River Road. The goal of this concept is to improve safety on Route 116 and River Road. In the past, there have been rear-end and angle collisions between vehicles turning onto River Road and through traffic on Route 116. There is also a bend on Route 116 that limits sight distance. The intersection has been designated a hazardous intersection by FRCOG. Concept 1 is depicted on Figure 5-2.

Figure 5-2
Route 116/River Road Improvements



■

Concept 2 – Signalize I-91 Interchange 24 Off-ramp at Route 5/10 (Whately)

Concept 2 involves providing a new traffic signal at the intersection of Route 5/10 at I-91 Exit 24 northbound off-ramp in Whately. In addition to providing traffic operations improvements, a traffic signal at this location would help address sight distance issues and queuing along the ramp.

■

Concept 3 – Signalize Route 5/10 at Elm Street/Allen Road (Northampton)

Concept 3 involves providing a new traffic signal at the intersection of Route 5/10 at Elm Street/Allen Road in Northampton. A traffic signal at this location could improve traffic operations and reduce queuing along Elm Street.

■

Concept 4 – Signalize I-91 Interchange 19 on-ramp at Route 9 (Northampton)

Concept 4 involves providing a new traffic signal at the intersection of Route 9 at the I-91 Interchange 19 southbound on-ramp in Northampton. Traffic operations between this signal and the existing traffic signal at Route 9 and Damon Road would be coordinated. The traffic signal would also provide queue management for the westbound left-turn lane (to I-91 south) by allowing a protected left-turn once the queue extends beyond the length of the lane. Loop detectors in the pavement could help manage the left-turn queue and trigger the signal phase once the queue reached a critical length. Westbound traffic along Route 9 would never be stopped by the traffic signal.

■

Concept 5 – Signalize I-91 Interchange 18 Southbound ramps at Route 5/10 (Northampton)

Concept 5 involves providing a new traffic signal at the intersection of Route 5/10 at I-91 Exit 18 southbound ramps in Northampton. Traffic operations at this signal would be coordinated with the adjacent existing signal at the Exit 18 northbound ramps.

■

Concept 6 – Signalize Damon Road at Industrial Road (Northampton)

Concept 6 involves providing a new traffic signal at the intersection of Damon Road and Industrial Road in Northampton. Given the proximity of Route 5/10 and Damon Road and the at-grade railroad crossing, a signal at Damon Road/Industrial Road would have to be coordinated with these adjacent signals.

■

Concept 7 – Signalize Route 116/47 (South Hadley)

Concept 7 involves providing a new traffic signal at the intersection of Route 47 and Route 116 in South Hadley to improve traffic flow and better accommodate pedestrians. Plans to signalize this intersection are already under design by MassHighway.

■

Concept 8 – Signalize Route 5 at Route 202 (Holyoke)

This concept involves providing a new traffic signal at the intersection of Route 5 at Lincoln Street (Route 202) in Holyoke.

■

Concept 9 – Signalize Route 116/Bay Road (Amherst)

This concept involves providing a new traffic signal at the intersection of Route 116 and Bay Road in Amherst. A signal at this location would require some realignment of the roadways to help address the skew of the intersection. The Town of Amherst is currently developing a Master Plan for this area, known as the Atkins Corner Master Plan. The improvement proposed under Concept 9 assumes the same geometry recommended by the Master Plan.

5.2 Infrastructure Improvements

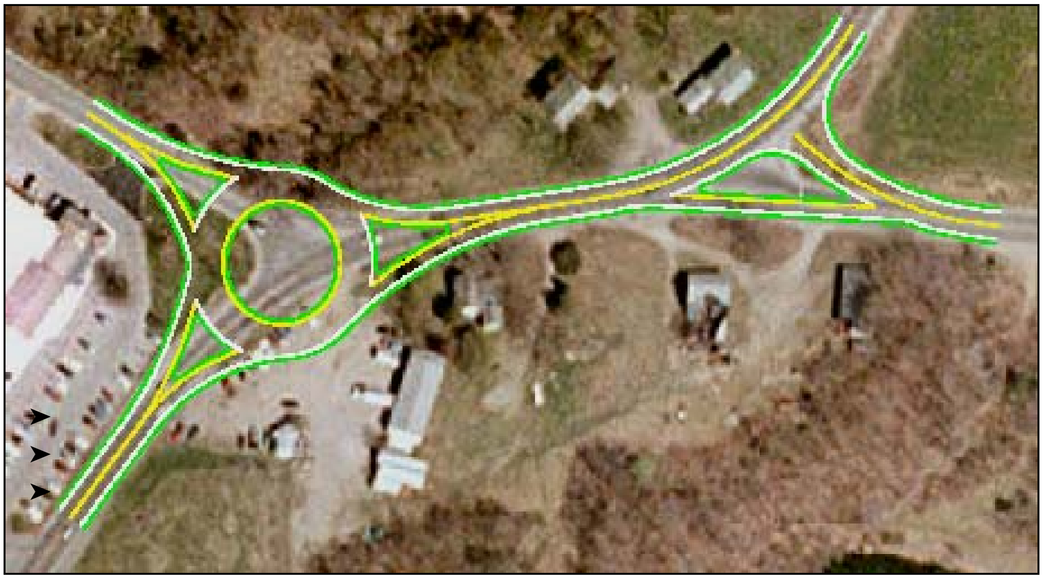
The infrastructure improvements were focused on congested intersections and corridors through the study area that create bottlenecks during peak hour conditions. Specifically, several of the infrastructure concepts focus on I-91 Interchange 19 in Northampton - a critical regional connection within the study area.

■

Concept 10 - Route 116/Bay Road Roundabout (Amherst)

Route 116 and Bay Road overlap for a short segment forming two unsignalized intersections. Through traffic on Route 116 has priority. Traffic entering from Bay Road experiences long delays caused by heavy volumes on Route 116. The need to address this busy segment of Route 116 by better accommodating Bay Road and slowing traffic on Route 116 have been noted. Concept 9 seeks to address these issues with a roundabout. Concept 9 is depicted on Figure 5-3.

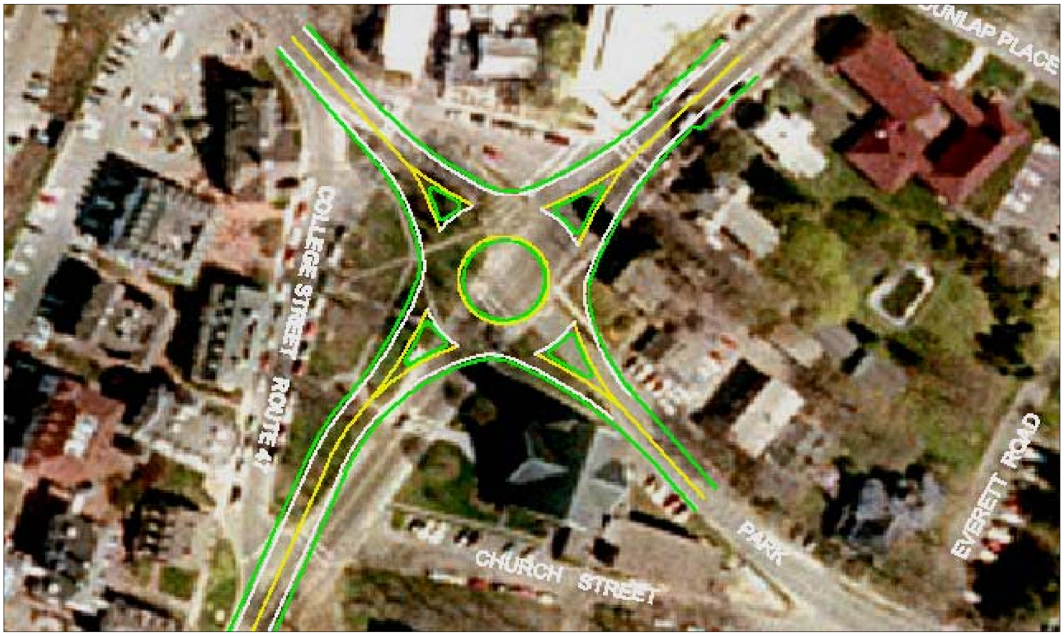
Figure 5-3
Route 116/Bay Road Roundabout



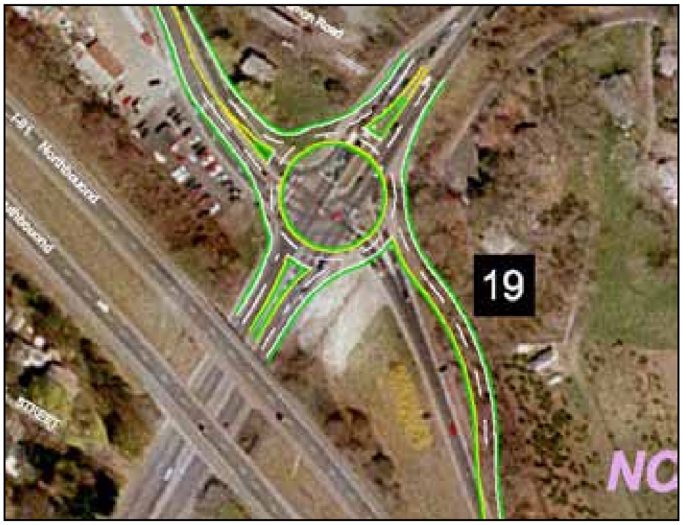
Concept 11 - Route 116/47 Roundabout (South Hadley)

The intersection of Routes 116 and 47 in South Hadley handles heavy traffic demands. This location is currently a skewed 4-way unsignalized intersection. Future plans by MassHighway will provide a 4-way traffic signal. Concept 11 looks at a roundabout option rather than a traffic signal. Concept 11 is depicted on Figure 5-4.

Figure 5-4
Route 116/47 Roundabout



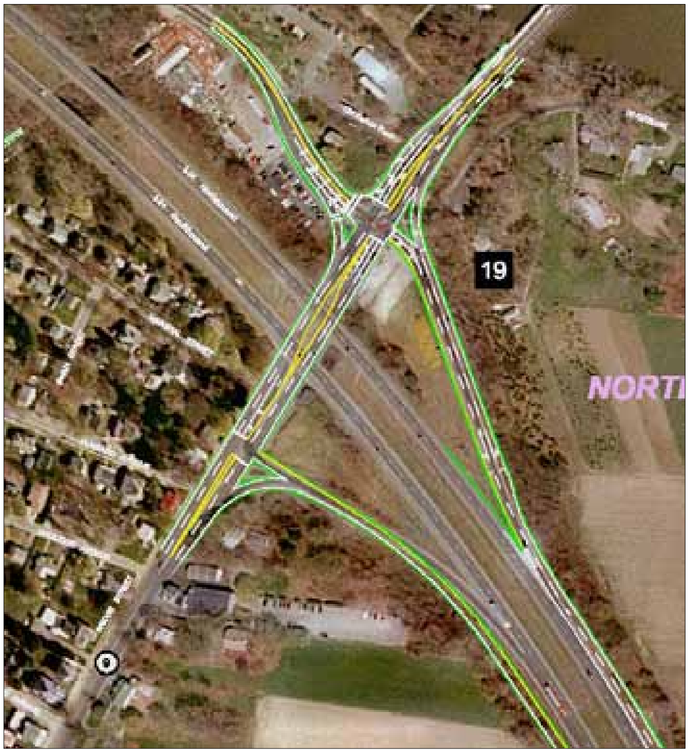
Concept 12 - Interchange 19 Roundabout (Northampton)



Concept 12 involves replacing the signal at Route 9/Damon Road with a roundabout. The goal is to improve operations by attempting to better balance the delays to Route 9, Damon Road, and the I-91 northbound off-ramp. Concept 12 is depicted on Figure 5-5.

Figure 5-5
Interchange 19 Roundabout

Concept 13 - Interchange 19 Signal System/Ramp Improvements (Northampton)



Concept 13 involves three key infrastructure improvements at Interchange 19. They are:

1. Adding a traffic signal to the intersection of Route 9/I-91 Interchange 19 on-ramp,
2. Improving the southbound on-ramp merge maneuver by lengthening the acceleration lane on I-91, and
3. Managing the queue on the northbound off-ramp by widening the off-ramp so that it departs I-91 in two lanes and quickly flares out to three lanes.

The traffic signals on Route 9 at Interchange 19 would operate as a coordinated system. The goal of Concept 13 is to focus on the problem area and add as much capacity as is reasonably needed. Concept 13 is depicted on Figure 5-6.

Figure 5-6
Interchange 19 Signal System/Ramp Improvements

■

Concept 14 - Interchange 19 Rotary (Northampton)

Concept 14 involves significant reconfiguration to Exit 19 to create a rotary and includes realigning I-91 northbound and southbound in the vicinity of the existing Exit 19 interchange. Concept 14 is depicted on Figure 5-7.

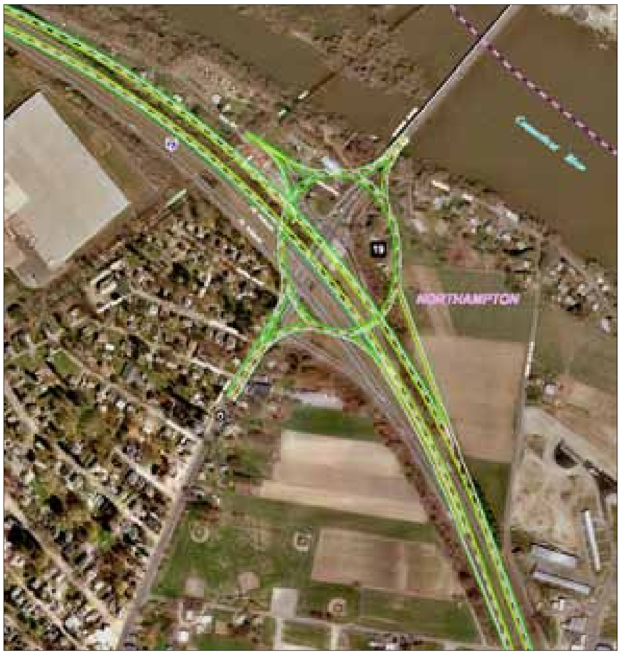


Figure 5-7
Interchange 19 Rotary

■

Concept 15 - Interchange 19 Ramps (Northampton)

I-91 Interchange 19 is a partial interchange, providing a northbound off-ramp and a southbound on-ramp. The goal of Concept 15 is to provide ramp connections that would make the interchange fully directional while addressing capacity deficiencies at signals on Route 9/Damon Road and Route 5/10/Damon Road. Concept 15 also seeks to mitigate the queue on the northbound off-ramp by providing a new off-ramp to Damon Road. A new signal would be provided on Route 9 at the I-91 southbound ramps that would operate as a coordinated system with the signal at Route 9/Damon Road. The realignment of the southbound on-ramp would enable added storage for left-turns between intersections on Route 9. Concept 15 is depicted on Figure 5-8.

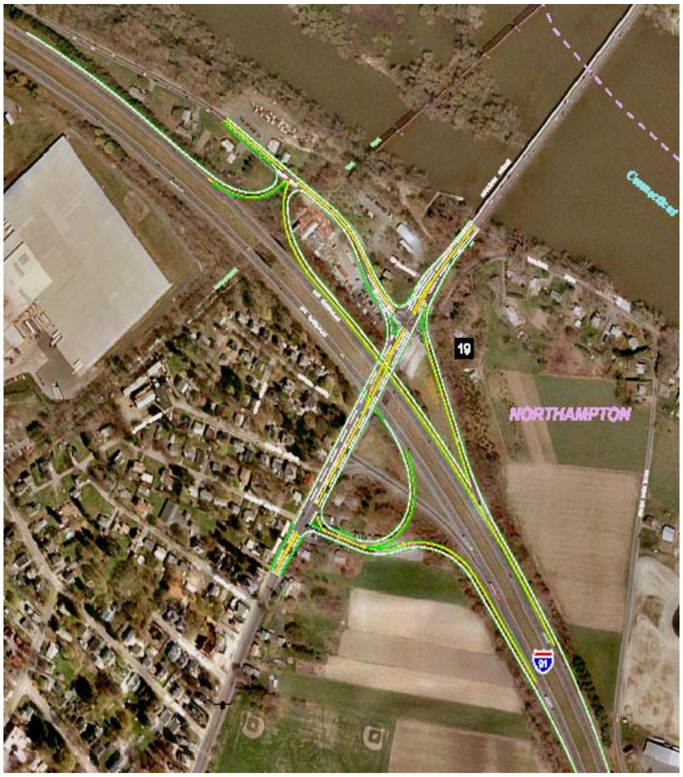


Figure 5-8
Interchange 19 Ramps

Concept 16 - Interchange 19 SB Flyover Ramp (Northampton)

Concept 16 involves accommodating the movement from Route 9 westbound to I-91 southbound with a grade-separated "flyover" ramp. The goal of Concept 15 is to improve traffic operations on Route 9 and Damon Road by removing traffic from the congested intersection of Route 9/Damon Road and from the left-turn movement from Route 9 onto I-91 southbound. Concept 16 is depicted on Figure 5-9.

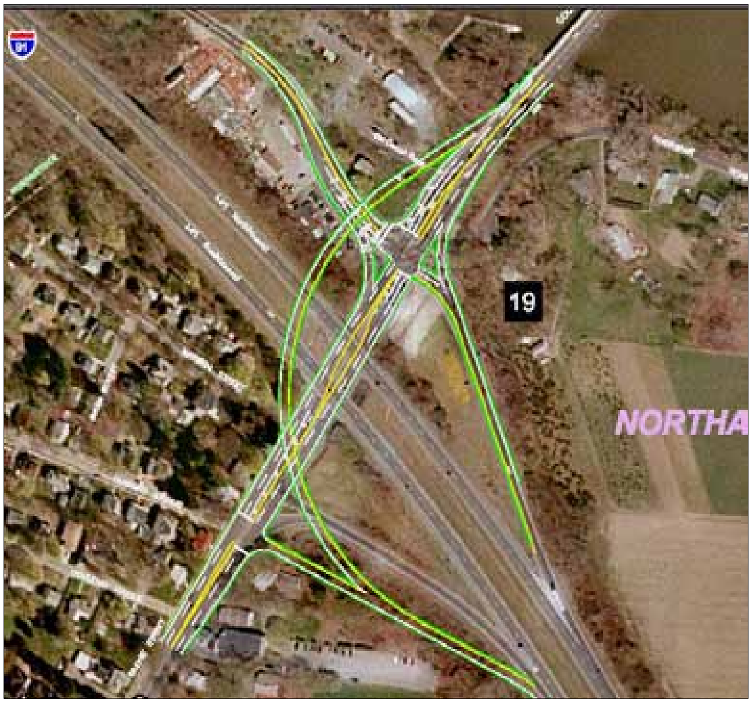


Figure 5-9
Interchange 19 SB Flyover Ramp

Concept 17 – Interchange 19 NB/SB Flyover Ramp (Northampton)

Concept 17 is similar to Concept 16, with an added connection to I-91 northbound on the flyover ramp. The goal of Concept 16 is to improve traffic operations on Route 9 and Damon Road. Concept 17 is depicted on Figure 5-10.

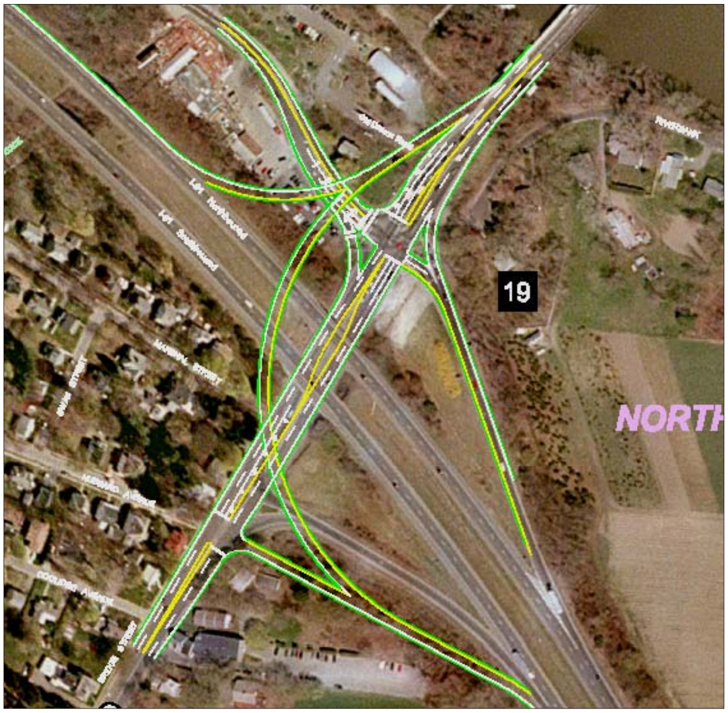


Figure 5-10
Interchange 19 NB/SB Flyover Ramp

Concept 18 - Route 9 Widening (Hadley, Route 47 to North Maple Street)

Route 9 varies from 2 to 4 through lanes from the Coolidge Bridge to Amherst. Under the statewide Transportation Improvement Plan (TIP), the segment on Route 9 from the Coolidge Bridge to Whalley Street (just west of Route 47) will be widened to 4 lanes with intersection improvements where needed. The TIP also includes traffic signal coordination from North Maple Street in Hadley to South Pleasant Street in Amherst. Once the TIP projects are completed, the segment of Route 9 from just east of Route 47 to North Maple Street is the remaining segment (in Hadley) that is not a consistent 4 lanes. Concept 17 involves widening Route 9 to accommodate 4 lanes with consistent shoulders to safely accommodate bicycles. Concept 18 also involves implementing right-turn-in, right-turn-out only access restrictions on Cross Path Road to minimize the potential for disruptions on Route 9 and the Coolidge Bridge caused by left-turns to and from Route 9. Improving traffic flow along Route 9 from Amherst through Hadley is also critical for ambulance and emergency vehicle access to/from Cooley Dickinson Hospital in Northampton. Concept 18 is depicted on Figure 5-11.

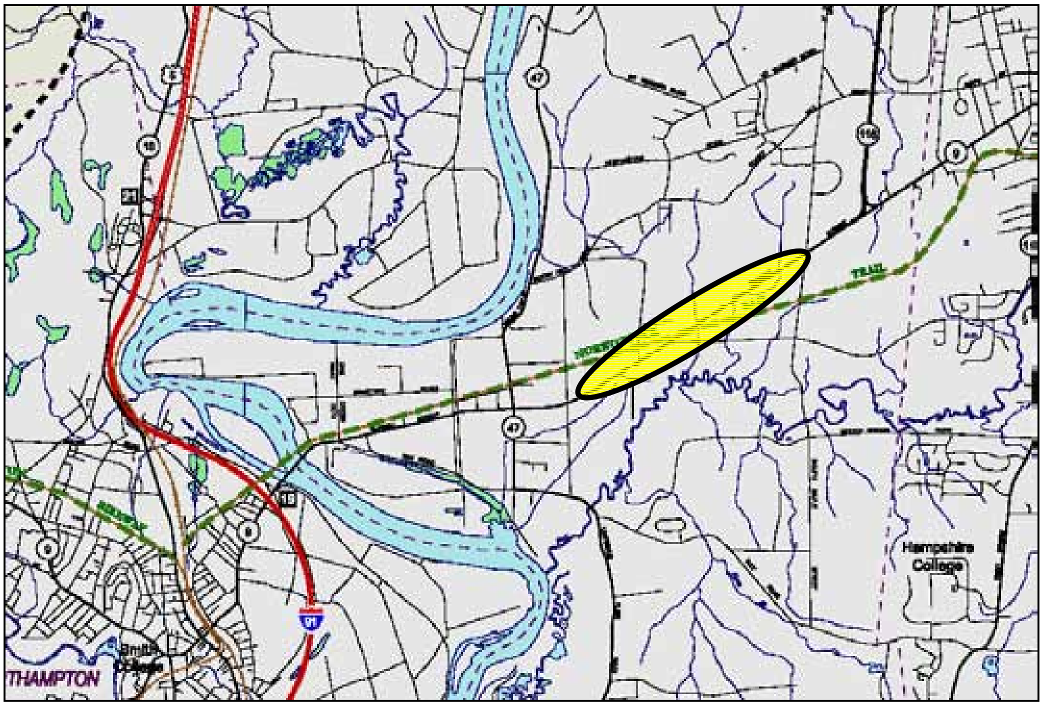


Figure 5-11
Route 9 Widening

Concept 19 - Route 116 Improvements (Hadley, Amherst, Sunderland)

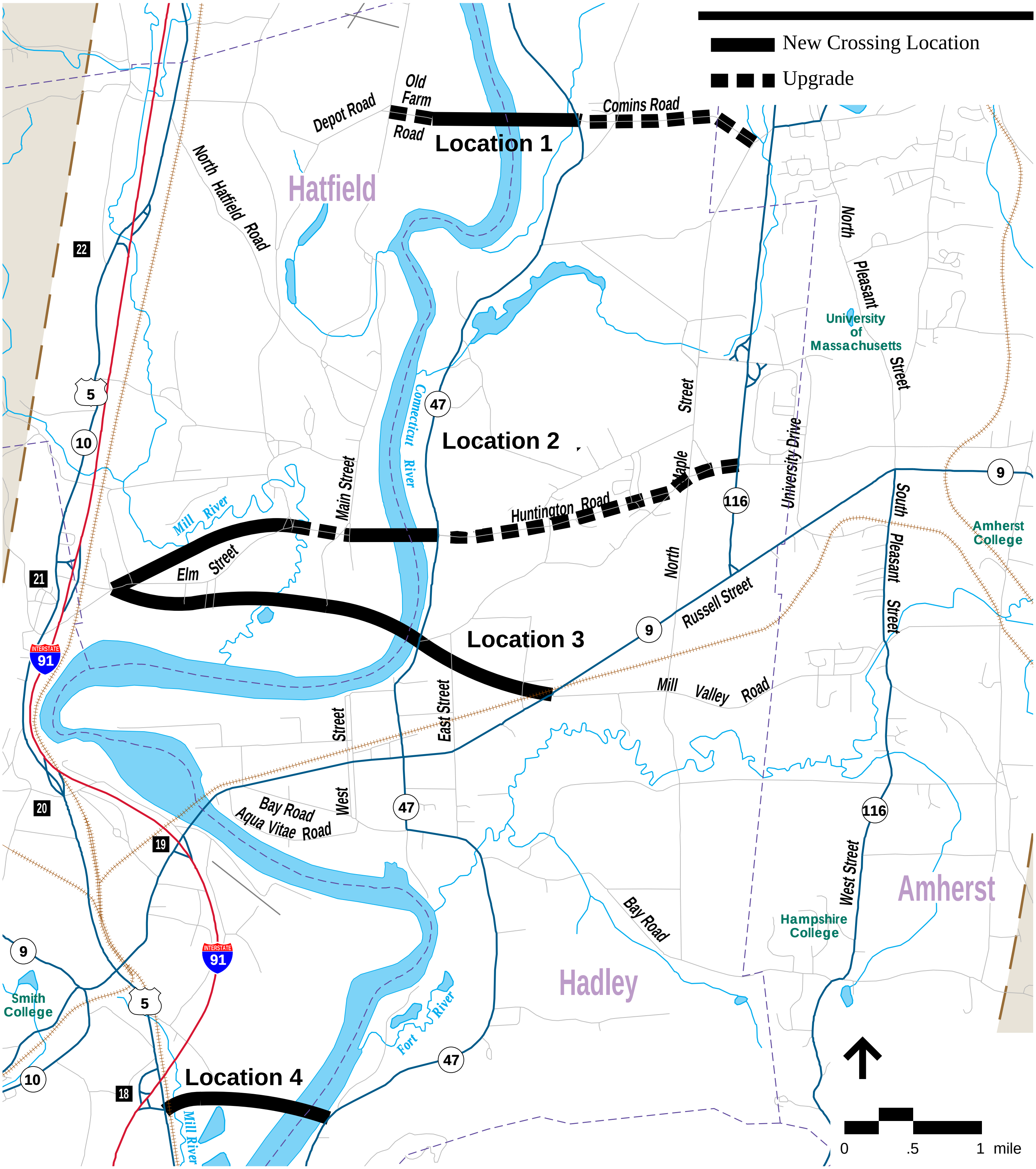
Concept 19 involves looking at intersection-level improvements along Route 116 from Hadley to Sunderland. Concept 19 includes providing exclusive turn-lanes and/or signal timing/phasing adjustments at Route 116 and Meadow Street (Route 63) and a southbound left-turn lane on Route 116 at Sunderland Road.

5.3 New River Crossings

This study considered the construction of a new bridge, and its associated connector roadways over the Connecticut River to relieve existing congestion along the Route 9 corridor. A new bridge could have major regional effects on traffic demands through the study area by shifting existing river crossings from one bridge to another. A new bridge could also generate additional river crossings – the result of altered origin-destination patterns. For example, a portion of trips between Hatfield and Northampton could become Hatfield-to-Amherst trips if a new bridge were built that made Amherst a more “attractive” destination.

To begin studying potential new river crossing locations, the desired travel patterns had to be identified through the completion of an origin-destination survey in April 2002 on the Coolidge and Sunderland Bridges. As part of the model calibration effort for the study, select-link analyses were conducted for the bridges to verify the origin-destination patterns assumed in the model. With knowledge of the desired travel patterns, the next steps involved identifying logical connections to the regional highway system, reviewing all the environmental constraints, and developing conceptual alignments for new river crossing locations. This involved layering all of the constraint maps prepared for this study and developing logical alignments that minimized impacts, to the extent possible, while meeting the desired travel demands.

A total of four river crossings were identified for evaluation – three north and one south of the Coolidge Bridge. Figure 5-12 depicts the bridge locations studied.



Connecticut River Crossing Transportation Study

Candidate Bridge Crossing Locations Figure 5-12

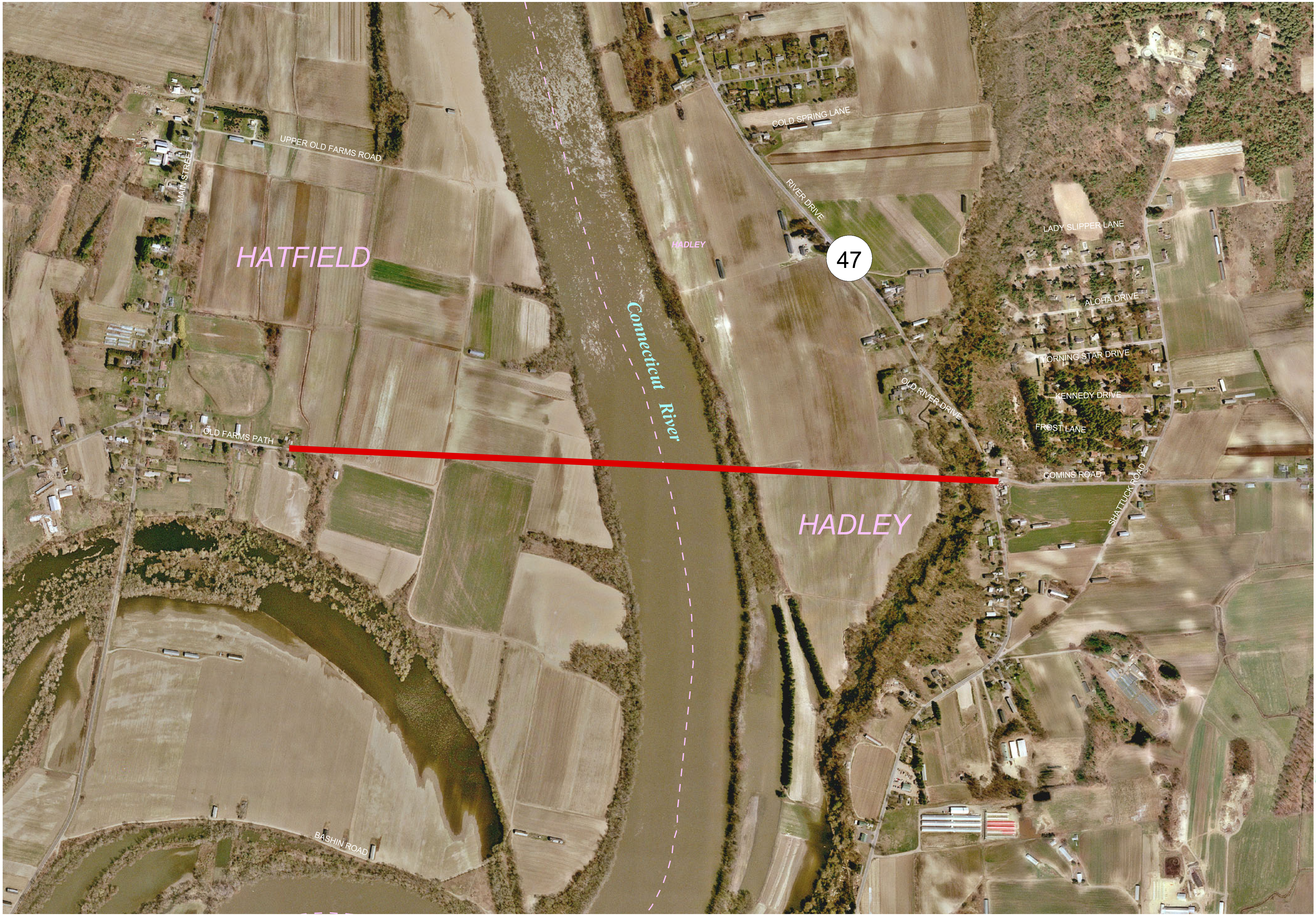


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Figure 5-12
Candidate Bridge Locations
Location 1
(Sheet 2 of 4)

Source: MassGIS. Orthophoto Date, Spring 2001

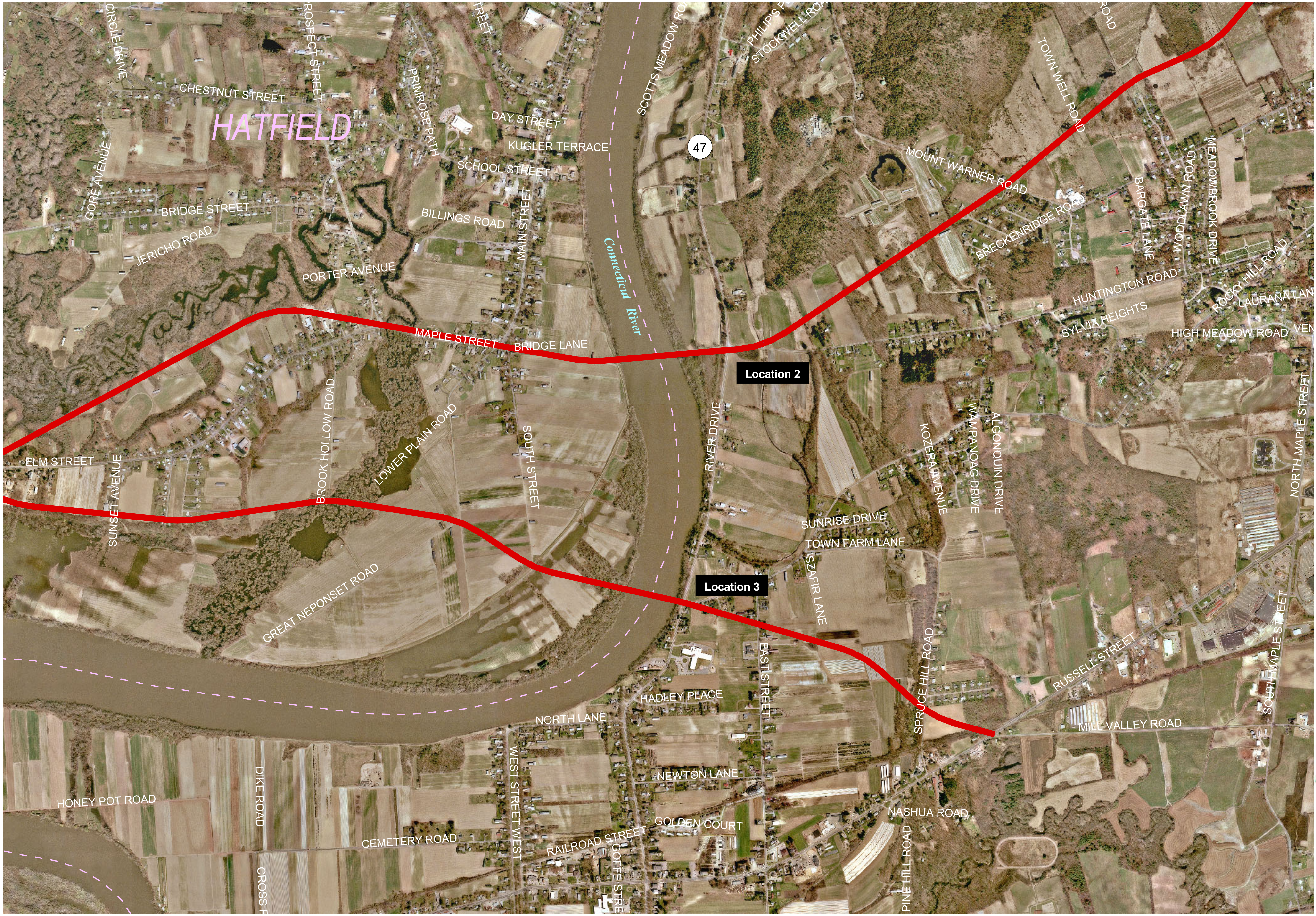

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Figure 5-12

Candidate Bridge Locations

Locations 2 & 3

(Sheet 3 of 4)

Source: MassGIS. Orthophoto Date, Spring 2001

Graphic File: \\Mawatr\GIS\08036\PS-PDF\Fig5-12_CandidateBridgeLocations-Sheet3.pdf
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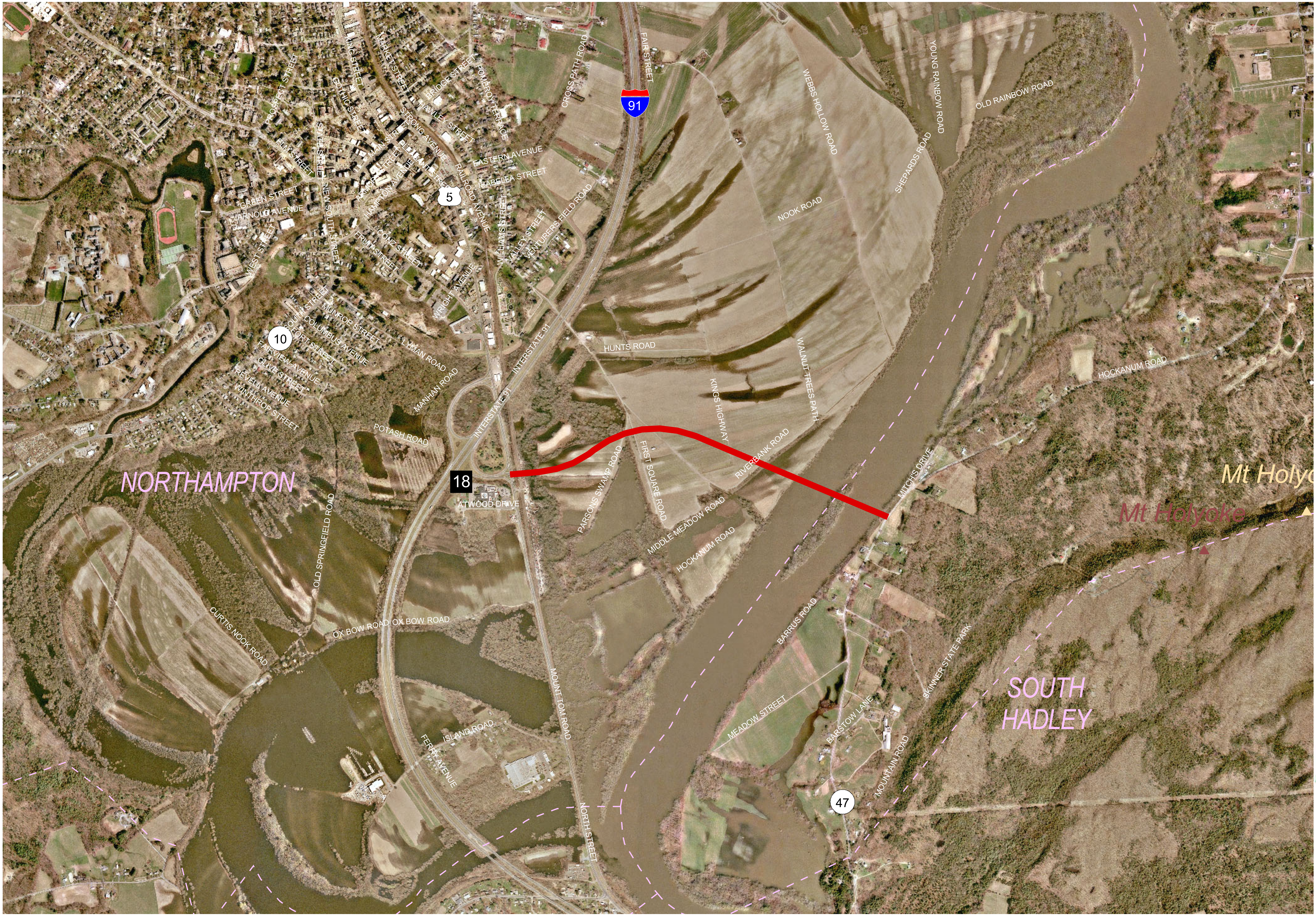

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MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 5-12
Candidate Bridge Locations
Location 4
(Sheet 4 of 4)

Source: MassGIS. Orthophoto Date, Spring 2001

- Bridge Location 1 provides a connection between Depot Road/Old Farm Road in Hatfield to Route 47/Comins Road in Hadley. Bridge Location 1 is located to the north of the Coolidge Bridge.

- Bridge Location 2 provides a connection between I-91 Interchange 21 in Hatfield to Route 116 in Hadley. Bridge Location 2 is located to the north of the Coolidge Bridge.

- Bridge Location 3 provides a connection between I-91 Interchange 21 in Hatfield to Route 9 in Hadley. Bridge Location 3 is located to the north of the Coolidge Bridge.

- Bridge Location 4 provides a connection between I-91 Interchange 18 in Northampton to Route 47 in Hadley. Bridge Location 4 is located to the south of the Coolidge Bridge.

5.4 Transportation Demand Management Alternatives

The transportation demand management (TDM) options were focused on lower-cost actions that could address identified deficiencies without any structural or geometric improvements to the existing infrastructure. They included:

- Park and Ride Lots
- Route 9 Transportation Management Association/UMass TDM
- Transit Options
- Car Ferry Crossings
- Pedestrian/Bicycle Accommodations
- Intelligent Transportation Systems (ITS)

5.4.1 Park And Ride Locations

Park and ride locations were considered throughout the study area. It was assumed that people attracted to the park and ride lots would either be intercept users (the lot is conveniently located somewhere between their origin and destination), casual users (people meeting and carpooling occasionally), or transit users (people taking direct transit connections from the lot to their final destination). All locations considered needed to be in a position to draw intercept and casual users from Route 9 and/or the Coolidge Bridge. The park and ride locations considered either provide safe and convenient locations for people coming from different directions to meet and carpool to their final destination together, or they provide direct or close connections to the I-91 corridor.

The introduction of new park and ride lots would have to be accompanied by transit coordination, advertising, education, or ridematching services for people working in the study area. Other incentives, like preferential parking, discounted parking rates, free parking, and guaranteed ride home service would also increase the ridesharing potential. The PVTA Passenger Survey conducted in April of 2001 indicated that about 80 percent of their ridership walks to the bus. If park and ride lots were made available, transit might become a viable alternative to more people. The locations for park and ride lots considered are described below.

Mount Tom/Oxbow

A park and ride facility located in the vicinity of Mt. Tom/Oxbow could provide transit services on the B48 bus between Holyoke Center and Northampton Center (along Route 5/10). From Northampton Center, transit connections are provided to the Amherst/UMass area.

Florence

A park and ride location in Florence would be served by the PVTA Route R44, which runs on 60-minute headways between Florence Center and Northampton Center. A connection to the B43 or M40 bus would be necessary for those riders destined along Route 9 east of the Coolidge Bridge.

To the North

To the north, the South Deerfield Center and Mt. Sugarloaf locations would have direct access to a bus route serving Amherst (the Green 46 bus). This service currently runs 6 buses daily in each location. The I-91 Exit 24 location has the potential to connect to transit service if the Green 46 or Pink 31 bus Route is modified. The Pink 31 bus currently travels between South Amherst and Sunderland Center on 10-20 minute headways. Extending the Pink 31 Route to the north of the Sunderland Bridge would provide a direct connection with the University and Amherst Center via a park and ride location at Interchange 24 or at Mt. Sugarloaf. Sunderland Center could also be a viable option for a park and ride location to the north. However, a convenient location could not be readily identified during the course of this study.

Existing Services

There are two existing park and ride locations. They are located at Sheldon Field (Route 9 in Northampton) and on Damon Road (at the Norwottuck Rail Trail head). The existing utilization at the Sheldon Field location is low, while the Damon Road location accommodates a mix of rail trail and park and ride users. With incentive programs, transit access, and signage, the usage of park and ride lots at Sheldon Field and Damon Road could be increased.

5.4.2 Route 9 TMA/UMass TDM

The Route 9 Transportation Management Association (TMA) was established in 1999 and included members such as the City of Northampton, U.S. Fish and Wildlife, Smith College, Cooley Dickinson Hospital, and UMass. Federal funding for the program expired in 2002. The TMA is no longer in operation.

However, UMass continues to run its own TDM program. Incentives offered by the University include carpool matching, parking discounts, salary based parking fees, preferred parking spaces, and the guaranteed ride home program. The number of UMass students and employees using the TDM program continues to increase annually although the total percentage of UMass employees who rideshare remain at less than five percent.

5.4.3 Transit Improvements

The transit improvements considered as part of this study involve increasing frequency, improving connections, decreasing travel times, adding new routes and providing park and ride lots to improve east-west travel in the study area by public transportation. The following transit enhancements were considered:

Route 9 Express Bus with Signal Preemption

This alternative investigates providing an express bus service along Route 9 that has the capability to preempt traffic signals along the corridor between Northampton Center, the University of Massachusetts, and Amherst Center. This service would replace the existing express bus route.

Fixed Rail or BRT line in the Route 9 Corridor

This alternative considers the feasibility of implementing a fixed rail or bus rapid transit (BRT) system between Northampton Center and the University of Massachusetts. The screening analysis examined a dedicated, separate right-of-way (similar to bridge alternative 2 described above) on a new alignment and/or the Norwottuck Rail Trail alignment, and a dedicated busway along Route 9. Figure 5-13 presents the typical cross-section required for a fixed rail or BRT system in separate alignment.

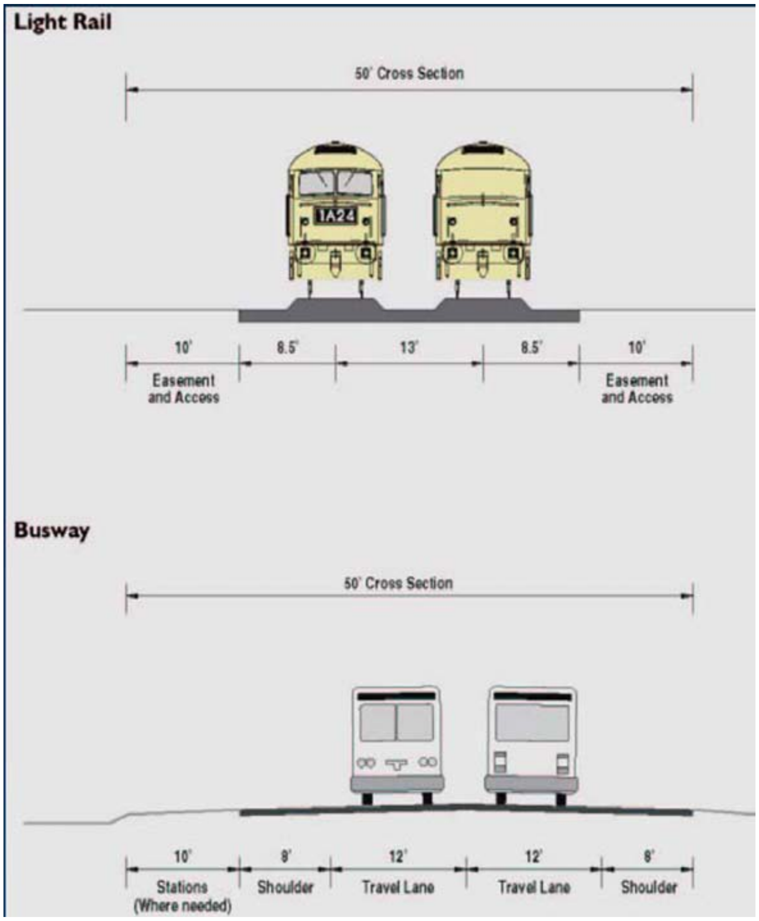


Figure 5-13
Typical Cross-section

Increased bus service to shopping malls

This alternative involves enhanced connections for pedestrians between transit stops and the Route 9 malls, as well as the potential to implement a shuttle service to run between the Route 9 bus stops, the Mountain Farms Mall, the Hampshire Mall, and the Stop & Shop Shopping Plaza.

Increased north/south bus service

The three main buses that serve Amherst from the North are as follows:

- **Route 31** travels between Sunderland and Amherst and runs on 10 to 20 minute headways throughout the day. During peak periods, the bus tends to reach capacity before it is able to finish picking up passengers.

- **Route 46** travels between South Deerfield and Amherst. This bus provides two round trips in the morning peak, one round trip midday, two round trips in the evening peak and one late night round trip. The service is not as frequent as the Route 31 bus service. When the Route 31 bus reaches capacity, this route will pick up passengers along the same route.
- **GMTA Amherst Route** travels between Greenfield and UMass via Turner Falls and Montague and provides one round trip in the morning and one round trip in the evening.

This alternative investigates the need and feasibility of providing hourly service on the Route 46 and Amherst Route buses and establishing a more frequent combined bus route on reduced schedule days. This alternative would require a joint service effort from the PVTA and the GMTA.

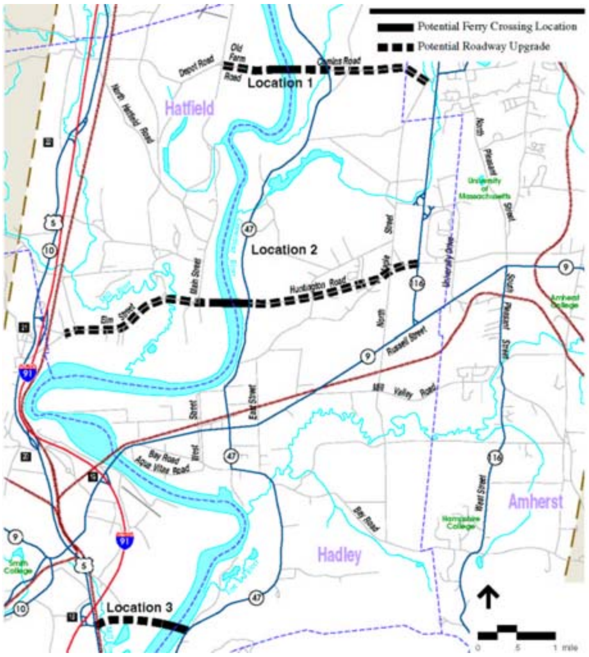
Increased bus service between Holyoke and Universities

This alternative would provide service between Veteran's Park and the five area colleges.

Extended night service

This alternative would provide extended night service to communities that do not currently provide bus service into the evening.

5.4.4 Car Ferry Crossings



The methodology of selecting ferry-crossing locations involved identifying the desired travel patterns established through the 2002 origin-destination survey, identifying logical connections across the river, reviewing all the environmental constraints, and developing potential crossing locations which would be supported by existing infrastructure.

Three river crossings were evaluated as potential ferry crossing locations. These river crossings are identical to the bridge crossing locations described above.
Figure 5-14 depicts the potential ferry crossing locations studied with the associated roadway upgrades.

Figure 5-14
Potential Ferry Crossing Locations

5.4.5 Pedestrian/Bicycle Improvements

While not expected to have a measurable effect on study area traffic operations, improvements were considered that could enhance the connectivity and safety of pedestrian and bicycle accommodations. Sidewalk installation or upgrade, crosswalk striping, consistent shoulder length, and/or direct connections to shopping malls would improve pedestrian and bicycle accommodations along Route 9 in Hadley and Routes 5/10 in Deerfield. They would provide easier access to trip attractions and could encourage people living in the area to walk or bike rather than drive. In addition to sidewalk and signal upgrades, the following improvements could help promote alternative modes of transportation.

Increased maintenance of the Norwottuck Rail Trail

This alternative investigated if better maintenance of the Norwottuck Rail Trail, particularly during the winter months, would encourage more users to choose the trail over their current mode of transportation.

Widening of the Norwottuck Rail Trail

The 1999 AASHTO guidelines were revised to recommend a 10-foot minimum width for bike trails. Currently at eight-feet, it is difficult for the rail trail to accommodate a variety of users during peak periods. This alternative includes widening the trail to provide the room and margin of comfort necessary for commuter and recreational bicyclists, walkers, and roller bladers.

Route 9 on-road bicycle lanes

This alternative considers on-road bicycle accommodations along Route 9 as an alternative to widening the rail trail.

Route 116 on-road bicycle lanes (Amherst to Sunderland)

This alternative considers on-road bicycle accommodations along Route 116 between Sunderland and Hadley

5.4.6 Intelligent Transportation Systems

There are several Intelligent Transportation Systems (ITS) projects currently on going in Western Massachusetts. MassHighway, the PVPC, and the PVTA have released new or updated deployment plans for ITS deployment throughout the I-91 corridor.

In addition, as part of the MassHighway program, the University of Massachusetts is undertaking a demonstration project on Routes 9 and 116. This alternative considers whether ITS might have a continuing role in addressing some of the study area's traffic management needs.

6.0 Evaluation of Alternatives

The alternatives presented in Chapter 5 were assessed using the evaluation criteria developed for the study. The evaluation criteria included traffic flow, safety, environmental effects, neighborhood effects, business considerations, and cost/schedule. This chapter presents the screening analysis for the alternatives considered.

A two level screening process was used to assess study alternatives. The preliminary screening involved developing concept plans, determining physical constraints, and quantifying the traffic benefits. Concepts with fatal flaws were dismissed from further consideration under the preliminary screening analysis. Fatal flaws included unacceptable traffic operations and physical design constraints. The secondary screening analysis involved evaluating the concepts using the evaluation criteria (including environmental and social impacts and costs).

6.1 Transportation System Management Improvements

As noted in Chapter 5, the transportation system management (TSM) improvements were focused on lower-cost actions to address identified deficiencies. These TSM actions do not involve significant infrastructure alterations or major environmental impacts. Options such as lane restriping, providing new traffic signals, or upgrading existing signals were considered. The following section summarizes the key impacts or benefits of the TSM concepts studied. Table 6-1 presents the nine locations reviewed and summarizes the potential benefits of each alternative. The location and description of each improvement alternative can be found in Chapter 5 (Figure 5-1). A detailed analysis of each alternative and its associated benefits/impacts is provided in the appendix to this report.

As shown in the table, the majority of these intersections are expected to operate at an unacceptable level of service during one or both of the peak hours under 2025 future conditions. The proposed signalization improvements are expected to result in acceptable levels of service during both the morning and evening peak hours.

Table 6-1
TSM Improvement Alternatives

				Future 2025 LOS					
		Existing 2000 LOS		No-Build Conditions		With Proposed Improvements			
City/Town	Description of Proposed Improvement	Morning Peak Hour	Evening Peak Hour	Morning Peak Hour	Evening Peak Hour	Morning Peak Hour	Evening Peak Hour	Construction Cost[1]	Peak Hour Traffic Signal Warrant Met
Deerfield	Exclusive turn lane(s) at Route 116 at River Road North	A	A	B	B	B	B	$12,500[4]	N/A
Deerfield	Exclusive turn lane(s) at Route 116 at River Road South[4]	A	A	B	B	B	B	$12,500[4]	N/A
Deerfield	Signalize Route 5/10 at I-91 Exit 24 Northbound ramps	C	C	F	F	C[2]	D[2]	$150,000	Yes
Northampton	Signalize Route 5/10 at Elm Street	C	E	D	F	B	B	$150,000	Yes
Northampton	Signalize Route 9 at I-91 Exit 19 southbound on-ramp	C	C	C	C	B	B	$150,000	Yes
Northampton	Signalize Route 5/10 at I-91 Exit 18 southbound ramps	C	E	C	F	B	D	$150,000	Yes
Northampton	Signalize Damon Road at Industrial Road	E	F	F	F	C	C	$150,000	Yes
South Hadley	Route 116 at Route 47	D	E	F	F	C	C	$175,000	Yes
Holyoke	Signalize Route 5 at Lincoln Street	C	C	F	F	B	D	$150,000	Yes
Amherst	Reconstruct and signalize Route 116 at Bay Road	C	C	E	F	A	B	$175,000[3]	Yes
Amherst	Exclusive left-turn lane at Route 116 and Sunderland Road	N/A	N/A	N/A	N/A	N/A	N/ A	$3,000	N/A
Amherst	Signal adjustments at Route 116 and Meadow Street	N/A	N/A	N/A	N/A	N/A	N/A	$2,000	N/A

1. Construction costs are exclusive of right-of-way, permitting, and design fees.
2. By widening the northbound off-ramp to two lanes, significant operational improvement is possible. Overall intersection operations would be at LOS B in the morning and LOS C in the evening.
3. Does not include cost for realignment of roadway and other redevelopment associated with Atkins Corner Plan.
4. Cost estimate assumes all work is accomplished within existing pavement. An estimate of $25,000 was calculated for both intersections. It is assumed that this equates to $12,500 per intersection.

N/A = Not Applicable

Concept 1 – Route 116/River Road Improvements (Deerfield)

Based on SAG input regarding safety and operational concerns, a left-turn lane warrant analysis was conducted at the intersections of River Road and Route 116 in Deerfield. Under existing conditions, the intersection to the east (River Road North) does not warrant a left-turn lane while the intersection to the west (River Road South) does meet the warrant. Under future 2025 conditions, the intersection to the east meets the warrant during the evening peak hour. Although both intersections operate at acceptable levels of service along the mainline, safety and sight distance concerns further enforce the need for turn lanes. As a result, left-turn lanes at both intersections should be included in the final recommendations to the study.

➤ **Recommendation – Incorporate concept into Recommended Action Plan**

Concept 2 – Signalize I-91 Interchange 24 Off-ramp at Route 5/10 (Whately)

Based on existing peak hour volumes, a traffic signal is warranted at this intersection. Projected to operate at LOS E/F under 2025 baseline conditions, Concept 2 will improve traffic operations to an acceptable LOS C. Engineering issues associated with providing a signal at this intersection would be minimal.

➤ **Recommendation – Incorporate concept into Recommended Action Plan**

Concept 3 – Signalize Route 5/10 at Elm Street/Allen Road (Northampton)

Based on existing peak hour volumes, a traffic signal is warranted at this intersection. Projected to operate at LOS F under 2025 evening baseline conditions, Concept 3 will improve traffic operations to an acceptable LOS B. Engineering issues associated with providing a signal at this intersection would be minimal.

➤ **Recommendation – Incorporate concept into Recommended Action Plan**

Concept 4 – Signalize I-91 Interchange 19 On-ramp at Route 9 (Northampton)

The volume of traffic on Route 9 eastbound results in few gaps for left-turns to efficiently process. The high eastbound demand, coupled with the high left-turn demand, results in the need for a traffic signal. Based on existing peak hour volumes, a traffic signal is warranted at this intersection. Projected to operate at LOS E/F under 2025 baseline conditions, Concept 4 will improve traffic operations to an acceptable LOS B or better. Engineering issues associated with providing a signal at this intersection include ensuring that loop detectors are installed on the left-turn lane to activate the signal once the queue exceeds the storage provided.

- **Recommendation – Incorporate concept into Recommended Action Plan**

Concept 5 – Signalize I-91 Interchange 18 southbound ramps at Route 5/10 (Northampton)

Based on existing peak hour volumes, a traffic signal is warranted at this intersection. Projected to operate at LOS F during 2025 evening baseline conditions, Concept 5 will improve traffic operations to an acceptable LOS C. Engineering issues associated with providing a signal at this intersection include ensuring that the signal is coordinated with the adjacent signal at the northbound ramps at Route 5/10.

- **Recommendation – Incorporate concept into Recommended Action Plan**

Concept 6 – Signalize Damon Road at Industrial Road (Northampton)

Based on existing peak hour volumes, a traffic signal is warranted at this intersection. Currently operating at LOS E/F during the morning and evening peak hours, Concept 6 will improve traffic operations to an acceptable LOS B. Engineering issues associated with providing a signal at this intersection include ensuring that the signal is coordinated with the adjacent at-grade railroad crossing.

- **Recommendation – Incorporate concept into Recommended Action Plan**

Concept 7 – Signalize Route 116 at Route 47 (South Hadley)

Based on existing peak hour volumes, a traffic signal is warranted at this intersection. Projected to operate at LOS F under 2025 baseline conditions, Concept 7 will improve traffic operations to an acceptable LOS A or better. This project is currently under design by MassHighway.

- **Recommendation – Incorporate concept into Recommended Action Plan**

Concept 8 – Signalize Route 5 at Route 202 (Holyoke)

Based on existing peak hour volumes, a traffic signal is warranted at this intersection. Projected to operate at LOS F under 2025 baseline conditions, Concept 8 will improve traffic operations to an acceptable LOS C or better. Engineering issues associated with providing a signal at this intersection would be minimal.

➤ **Recommendation – Incorporate concept into Recommended Action Plan**

Concept 9 – Signalize Route 116/Bay Road (Amherst)

Based on existing peak hour volumes, a traffic signal is warranted at this intersection. The traffic analyses show that a traffic signal at this location will improve intersection operations to LOS B or better during the peak hours. Although the horizon year for this study extends well past the proposed build year for Atkins Corner, it should be noted that a much more concentrated growth estimate was made as part of the Atkins Corner Master Plan. Therefore, it is possible that LOS results will differ; depending on the future development scenario progressed. The Town should continue to work with MassHighway for signal permitting and design at this intersection.

➤ **Recommendation – Incorporate concept into Recommended Action Plan**

Summary of TSM Assessment

Based on the analysis presented, traffic signals are recommended at eight locations meeting peak hour signal warrants. As part of the design process for these proposed traffic signals, Automatic Traffic Recorder (ATR) data will be required to ensure that the 8-hour and 4-hour traffic signal warrants are met. It should be noted that none of the intersections meet the traffic signal warrants based on vehicle crash experience, school zones, or pedestrian volumes.

6.2 Infrastructure Improvements

The infrastructure improvements were focused on congested intersections and corridors through the study area that create bottlenecks during peak hour conditions. Infrastructure improvements involve physical modifications to the roadway system and tend to be more capital intensive actions. The results of the screening analysis are presented below.

Concept 10 - Route 116/Bay Road Roundabout (Amherst)

A roundabout is expected to address traffic congestion and help reduce speeds on Route 116 (see figure 5-3). However, pedestrians and bicyclists would be better accommodated at this location with a traditional traffic signal and 4-way intersection alignment. Moreover, the roundabout is not consistent with the Atkins Farm Master Plan effort underway by the Town of Amherst.

- **Recommendation – Dismiss concept from further consideration**

Concept 11 - Route 116/47 Roundabout (South Hadley)

A roundabout is expected to address the traffic congestion at the intersection of Route 116/47 (see figure 5-4). Although the roundabout will work well from a traffic standpoint, the roundabout would impact a sizeable portion of the common area at the southwest quadrant of the intersection. Furthermore, plans to signalize this intersection, that address the identified deficiencies, are well underway by MassHighway.

- **Recommendation – Dismiss concept from further consideration**

Concept 12 - Interchange 19 Roundabout (Northampton)

Concept 12 (as shown in Figure 5-5) does not result in acceptable operations on Damon Road or the I-91 off-ramp. The entering demands on Route 9 are too high, providing few gaps for traffic entering from Damon Road or the off-ramp. As a result, the queue on the ramp would worsen, raising safety issues on I-91. Truck movements would also be more difficult through the roundabout, further impacting overall operations.

- **Recommendation – Dismiss concept from further consideration**

Concept 13 - Interchange 19 Signal System/Ramp Improvements (Northampton)

Concept 13 (as shown in figure 5-6) adequately handles the projected demands through Interchange 19. The additional off-ramp lane on I-91 helps mitigate the queue on the ramp. This alternative, in addition to the provision of a signal at the southbound on-ramp (Concept 4), will aid the traffic turning at the interchange as well as mitigate queuing along Route 9 and I-91.

- **Recommendation – Retain concept for further consideration (see Section 6.2.1 below)**

Concept 14 - Interchange 19 Rotary (Northampton)

Concept 14 (figure 5-7) does not result in acceptable operations. The entering demands on Route 9 are too high in the evening peak hour, providing few gaps for traffic entering from Damon Road or the off-ramp. Moreover, very short weaving segments with high volumes would be created, raising safety concerns. As a result, the queue on the ramp and safety issues on I-91 would worsen. Concept 14 would impact the Coolidge Bridge abutment and would not allow for a grade separated rail-trail crossing at Damon Road. The potential traffic management costs involved with this complex alternative would be significant.

➤ **Recommendation – Dismiss concept from further consideration**

Concept 15 - Interchange 19 Ramps (Northampton)

Concept 15 is presented in Figure 5-8. This concept helps relieve traffic congestion at Route 5/10/Damon Road, at Route 9/Damon Road, and along Route 9 at Interchange 19. The traffic operations analyses indicate the following benefits associated with Concept 15:

- The proposed northbound off-ramp onto Damon Road allows the existing off-ramp onto Route 9 to be designated a right-turn only. Making the existing off-ramp a right-turn only onto the Coolidge Bridge would in turn simplify the Route 9/Damon Road intersection by allowing the signal to operate with one less entering traffic stream, effectively transforming the location from a 4-way to a 3-way intersection.
- The proposed northbound on-ramp from Damon Road would significantly improve conditions at Route 5/10/Damon Road by intercepting traffic destined for I-91 northbound before it reaches the Route 5/10/Damon Road intersection.
- Similarly, the proposed southbound off-ramp onto Route 9 would shift traffic away from Route 5/10 and Damon Road, keeping this traffic on I-91 longer and providing a direct connection to Route 9 eastbound.
- The most prevalent engineering issue associated with Concept 15 is the design of the new structure and ramps to Damon Road in light of the rail-trail crossing at Damon Road and the proximity of Damon Road to I-91.

➤ **Recommendation – Retain concept for further consideration (see Section 6.2.1 below)**

Concept 16 - Interchange 19 SB Flyover Ramp (Northampton)

By removing traffic through two busy intersections, Concept 16 (figure 5-9) is expected to solve the traffic operations deficiencies on Route 9 and Damon Road. However, the design of a grade-separated ramp introduces many engineering issues. The ramp would depart Route 9 on a very steep grade in order to adequately clear Damon Road and the already elevated I-91 structure. Based on this conceptual design, it appears that the ramp could impact the Coolidge Bridge in order to meet design standards. As a result, it was determined more study was warranted.

- **Recommendation – Retain concept for further consideration (see Section 6.2.1 below)**

Concept 17 – Interchange 19 NB/SB Flyover Ramp (Northampton)

As shown in Figure 5-10, Concept 17 is similar to Concept 16, with an added connection to I-91 northbound on the flyover ramp. Traffic operations benefits and engineering issues are similar to those of Concept 16.

- **Recommendation – Retain concept for further consideration (see Section 6.2.1 below)**

Summary of Infrastructure Assessment

Table 6-2 summarizes the infrastructure improvement concepts that were refined and analyzed as part of the secondary screening process.

Table 6-2
Infrastructure Improvement Summary

			Estimated Environmental Impacts				
	Location	Route 9/Coolidge Bridge Effects	Wetlands	100-year Floodplain	Farmland	Historic	Estimated Cost ($2003)[1]
Interchange 19							
Concept 13 – Signal System/Ramp Improvements	Northampton	Improved Westbound Queues	Low	Negligible	None	None	$3.9 Million
Concept 15 – Fully Directional Interchange	Northampton	Improved Westbound Queues	Low	High (3.8 acres)	Low	None	$6.6 Million
Concept 16 – Southbound Flyover Ramp	Northampton	Improved Westbound Queues	Low	Moderate (1.7 acres)	Low	None	$7.3 Million
Concept 17 - Northbound/ Southbound Flyover Ramp	Northampton	Improved Westbound Queues	Low	Moderate (1.7 acres)	Low	None	$8.4 Million
Route 9							
Concept 18 – Route 9 Widening (with access management/signal coordination	Hadley	+2,200 vehicles (+5 percent)	Low (culvert extensions)	None	Low	Hadley Center	$4.2 Million
Route 116							
Concept 19 – Route 116 Widening	Amherst/ Sunderland	None	Low (culvert extensions)	Low	Low	None	$4.7 Million

[1] Construction costs are for comparison purposes only, based on MHD 2002 unit prices. Estimates are not based on land survey and do not include land acquisition costs or design/permitting fees.

6.2.1 Interchange 19 Resolution

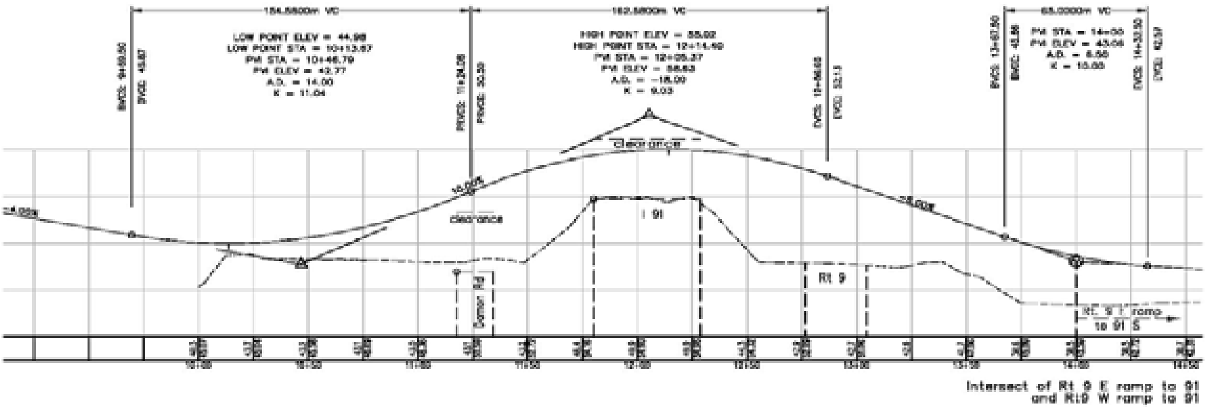
As shown in Table 6-2, four of the six remaining infrastructure alternatives (as identified above) center around the I-91 Exit 19 interchange, a critical regional connection within the study area.

The lowest cost, least intrusive improvement is the Signal System/Ramp Improvements, whereby the traffic signal system would be implemented as a short-term improvement and the ramp widening as a medium-term improvement. In addition to new traffic signal controls, this alternative would improve the southbound on-ramp merge maneuver by lengthening the acceleration lane on I-91, and manage the queue on the northbound off-ramp by widening the off-ramp. The goal of this improvement is to provide as much capacity as is reasonably needed. Based on the analysis, the identified ramp and signal system improvements will adequately handle the projected 2025 demands through Interchange 19. The additional off-ramp lane on I-91 helps mitigate the queue on the ramp that today occasionally affects mainline flow along I-91. The provision of a signal at the southbound on-ramp that is coordinated with the adjacent off-ramp signal helps left-turns onto I-91 and manages the queues on Route 9. Although this improvement alternative could potentially affect rare species habitats in the vicinity of the river, its impacts to wetlands and surrounding land use are much less than other alternatives considered for the area. As a result, it remains the preferred alternative for Interchange 19.

Three more significant alternatives to the Interchange 19 ramp system were considered as long-term (beyond 10 years) improvement options. I-91 Interchange 19 is currently a partial interchange, providing a northbound off-ramp and a southbound on-ramp. The goal of the Full Interchange alternative is to provide ramp connections that would make the interchange fully directional while addressing capacity deficiencies at signals on Route 9/Damon Road and Route 5/10/Damon Road. This alternative proposes construction of a northbound on-ramp from Damon Road to I-91 and relocation of the northbound off-ramp movement to Northampton to the north. The northbound off-ramp movement towards Hadley would remain in the existing location. However, the analyses show that the spacing of traffic signals along Route 9 would not be able to accommodate the added demands for a new southbound off-ramp and the resulting queues. Modification of this alternative to provide southbound off-ramp access to Route 9 eastbound only would address these deficiencies. With this change, this alternative remains an attractive long-term solution for Interchange 19 should traffic growth be greater than current projections.

The final two alternatives considered grade separating the on-ramp maneuvers. While a flyover ramp from the Coolidge Bridge to I-91 southbound or I-91 northbound and southbound appear to effectively solve traffic congestion issues along Route 9 and Damon Road, the design of such a ramp within the restrictions of the current Coolidge Bridge introduces many engineering issues. To avoid reconstruction impacts to the Coolidge Bridge, a ramp would have to begin on the Northampton side of the bridge abutments. This forces the ramp to depart Route 9 at a very steep grade in order to adequately clear Damon Road and I-91. Based on the ramp profile shown in Figure 6-1, this grade barely meets MassHighway’s maximum allowable grade standard.

Figure 6-1
I-91/ Route 9 Ramp Profile



Based on review of available information, VHB does not believe the ramp can be appropriately designed without affecting the bridge itself. The alternative to this steep grade is to have the flyover ramp depart Route 9 on the Coolidge Bridge. This would have a significant impact to the new bridge structure and would require relocation of the bridge abutment. Due to the level of impact this alternative would have on the surrounding area, the fly-over alternatives are not recommended as part of this study.

If a major infrastructure project is progressed at this location (towards a full interchange), a detailed feasibility study and an interchange justification report will have to be completed to advance the new interchange. As part of the federal process, construction of a full interchange must be considered and the preferred alternative selected based on feasibility, cost-benefit, traffic operations/impacts, environmental constraints, and whether the alternative meets the FHWA criteria. Whenever possible, the FHWA encourages the construction of full interchanges. This is especially true when a partial interchange currently exists and a proposal to modify part of it is put forward.

- **Recommendation – Incorporate Concepts 13 and 15 into Recommended Action Plan**

6.2.2 Corridor Improvements

The following summarizes the assessment of corridor-wide improvements along Route 9 and Route 116.

Concept 18 - Route 9 Widening - Route 47 to North Maple Street (Hadley)

As presented in Table 6-2, widening Route 9 to a consistent four-lane section (through Hadley) has the potential to attract 2,200 new trips to the Route 9 corridor, resulting in a 5 percent increase in traffic on the Coolidge Bridge. The added demand would be accommodated with a higher capacity on Route 9. To accommodate the added traffic, infrastructure improvements would be needed at Interchange 19 and at the Route 9/Route 47 intersection. Moreover, Concept 17 fits well with the planned TIP improvements along Route 9.

As discussed in Chapter 5, Route 9 varies between two and four lanes throughout the study area. Once all of the slated Route 9 construction is complete, the segment of Route 9 from just east of Route 47 to North Maple Street is the only remaining segment between the Coolidge Bridge and University Avenue (at the Hadley/Amherst Town Line) that does not carry two travel lanes in each direction. The improved four/five-lane section of Route 9 is projected to operate at acceptable levels of service through 2025 with the exception of the Route 9/Route 47 intersection (see later documentation). At this intersection, an acceptable level of service can be obtained through the 2025 design year by restricting left-turns from Route 9 to Route 47. Chapter 5 proposed widening the final section of Route 9 to provide four lanes and consistent shoulders. This segment of Route 9 currently operates at level of service E and is projected to be at capacity prior to 2025.

Based on the project team's proposed widening, the Study Advisory Group requested an analysis of the section of Route 9 as a three-lane cross-section – one travel lane in each direction and a center two-way left-turn lane (TWLTL). There is no formally accepted practice for analyzing the potential effectiveness of a two-way left-turn lane as few before/after studies have been made and application varies greatly by location. The capacity and operational benefits have been documented to depend largely on the volume of turning traffic and the availability of pavement to bypass turning traffic. The higher the turning traffic and the fewer opportunities to bypass that traffic, the larger the operational benefits. (For other projects, VHB has estimated capacity benefits as much as 25 percent).

However, in the case of this section of Route 9, turning traffic is moderate to light and shoulders are regularly used to bypass turning traffic. As a result, the operational gains can be expected to be somewhat reduced. Near term benefits of implementing a TWLTL along the section of Route 9 from just past Route 47 to North Maple Street would be realized by motorists turning left, into and out of properties along Route 9; however, delays along this section of Route 9 (as the roadway narrows from four lanes to two lanes and through the two or three-lane cross-section) would still be prevalent during peak periods.

Furthermore, the land adjacent to Route 9 through the two-lane section while mostly residential today is zoned commercial until 500 feet from the road. If allowed to develop commercially, the useful life of the three-lane cross-section is diminished. In fact, future signalized access locations will likely require a five-lane cross-section along this section of the Route 9 corridor. The approximate development thresholds for meeting warrants for signalized access are:

- Residential – development greater than 100 units
- Retail – development greater than 30,000 square feet
- Industrial – development greater than 100,000 square feet
- High turnover (sit down) restaurant – development greater than 10,000 square feet

If there is a desire to retain a maximum of a three-lane cross-section through this section of Route 9 for the foreseeable future (in combination with other demand management actions), the Town of Hadley should give consideration to rezoning large stretches of the corridor and aggressively managing access points to existing properties. In addition, given Route 9's significant role in servicing the region, a major increase at the University of Massachusetts (without a plan to manage increased transportation demands) would likely trigger the need for improving this section of the corridor. A Corridor Preservation Plan that broadly links land use and transportation decisions is vital to future mobility of this regional corridor.

Also suggested, are improvements at the intersection of Route 9 and Route 47. Based on the current and projected traffic volumes for the area, operations at the intersection can be expected to improve from LOS F to LOS C by restricting left-turns from Route 9 onto Route 47 in both directions. Vehicles traveling westbound on Route 9 could make this left-turn at Route 116, South Maple Street, East Street, or West Street. (It is likely all of these roadways would be utilized to a certain degree depending on the vehicle's origin and destination). Traveling eastbound on Route 9, vehicles could turn left at West Street, East Street, Spruce Hill Road, or North Maple Street. The analysis conducted does show that the displaced left-turns could be entirely accommodated at East Street with the proposed widening. In addition to turn restriction, by providing consistent shoulders, traffic signal and pedestrian timing upgrades, and ADA compliant ramps and sidewalk widths, conditions for pedestrians and bicyclists can also be improved at the intersection and along the corridor.

- **Recommendation – Incorporate concept into Recommended Action Plan**

Concept 19 - Route 116 Improvements (Hadley, Amherst, Sunderland)

A preliminary analysis showed that no infrastructure improvements are necessary along Route 116, as traffic demands do not warrant increased capacity and adequate shoulders are provided for bicyclists along the entire corridor between Sunderland and Hadley. Further analysis identified potential TSM improvements at spot locations along the corridor that will help traffic flow on Route 116 while improving conditions for bicyclists and pedestrians.

Outside of the turning lanes recommended at River Street (see above), the scope of this alternative has been narrowed to focus on TSM improvements to the intersections of Route 116 with Meadow Street (Route 63) and Route 116 with Sunderland Road.

VHB investigated the potential need for exclusive left-turn lanes on all approaches to the intersection of Route 116 and Meadow Street (Route 63), particularly along Route 116, due to the high speeds. The MassHighway crash database was consulted for crash experience over the past three years. Although the intersection is not listed as a high crash location, the data show 20 crashes at the intersection between 1999 and 2001 (the latest data available). Of these 20 crashes, half were listed as angle accidents, indicating a potential safety concern for turning vehicles. Signal timing and phasing adjustments could improve safety conditions at this intersection. An in-field inspection of the traffic signal equipment revealed that an upgrade would be necessary to accommodate this phasing. However, a new signal cabinet is already present at the intersection and an upgrade is under way by MassHighway. The new signal equipment would likely be easily modified to accommodate timing and/or phasing changes. The field inspection and crash history review do not indicate a need for exclusive left-turn lanes at this location.

The potential for a left-turn lane from Route 116 southbound onto Sunderland Road was investigated at the intersection of Route 116 and Sunderland Road. Both crash experience and intersection operations were reviewed. The MassHighway crash database was consulted for crash experience at this location. The data show an average of two crashes per year for the last three years currently available, therefore a left-turn lane is not warranted based on crash experience. However, due to the heavy southbound left-turn traffic volumes at this location, the intersection meets the warrants for an exclusive left-turn lane.

Recommendation – Incorporate concept into Recommended Action Plan

6.3 New Bridge Crossings

As noted in Chapter 5, four river crossings were studied using the regional travel demand model to estimate the traffic shifts that might occur. To do so, a link was added to the roadway network in the model that represented a new bridge. With this new link, the model was rerun and the resulting bridge demands and trip pairings were analyzed. A new bridge could have major regional effects on traffic demands through the study area by shifting existing river crossings from one bridge to another. A new bridge could also generate additional river crossings – the result of altered origin-destination patterns. For example, a portion of trips between Hatfield and Northampton may become Hatfield-to-Amherst trips if a new bridge were built that made Amherst a more “attractive” destination. Table 6-3 shows the demand for the new bridges, the resulting shifts from the Coolidge Bridge, and the corresponding new river crossings.

As Table 6-3 indicates, the model shifted demands away from other bridges and altered trip pairings where trips that previously did not cross the river would now use the new bridge. These “new river crossing” trips are the result of improved east-west access provided by a new bridge. For example, Location 1 was forecast to carry 10,700 vehicles per day, shift 3,600 vehicles per day away from the Coolidge Bridge, and generate an additional 3,100 river crossing trips. The bridge demands varied from 7,000 vehicles to 12,000 vehicles per day – resulting in year 2025 volume reductions on the Coolidge Bridge of between 7 percent and 17 percent. Location 2 was forecast to carry the most traffic (12,000 vehicles daily). Location 3 was forecast to shift the most traffic from the Coolidge Bridge (17 percent).

The following sections summarize the preliminary screening assessment for each of the four bridge locations considered.

The alternatives evaluation demonstrated that the recommended improvement program can address study area congestion and mobility concerns identified under existing and future conditions without the construction of an additional bridge and connector roadway over the Connecticut River. (The study did examine four potential new bridge alignments --three locations north of the Coolidge Bridge and one location south. All four bridge locations resulted in severe impacts to wetlands, farmland, habitat, and surface/groundwater resources. Moreover, the extent of floodplain on either side of the Connecticut River would make the bridge span very long and expensive to construct. The bridges that were considered all resulted in significant environmental and social impacts that outweighed the associated traffic benefits.)

Table 6-3
New River Crossings Studied

	2025 Bridge Demand[1]	2025 Coolidge Bridge Demand Reduction[1]	Estimated Environmental Impacts				Estimated Cost ($2003) [2]
			Wetlands	100-year Floodplain	Farmland	Historic	
Location 1 - North of the Coolidge Bridge, connecting Depot Road/Old Farm Road (Hatfield) with Comins Road/ Route 116 (Hadley)	10,700	-3,600 (-9%)	N/A	N/A	N/A	N/A	N/A
Location 2 - North of the Coolidge Bridge, connecting I-91 Interchange 21 (Hatfield) with Route 116 (Hadley)	12,000	-6,800 (-16%)	High (4.9 acres)	High (20.1 acres)	High (32.9 acres)	Hatfield Center, Elm Street, Mill Street, Prospect Street	$ 33.4 Million
Location 3 - North of the Coolidge Bridge, connecting I-91 Interchange 21 (Hatfield) with Route 9 (Hadley)	10,800	-7,300 (-17%)	High (4.4 acres)	High (14.9 acres)	High (25.1 acres)	Hatfield Center, Elm Street,	$ 60.0 Million
Location 4 - South of the Coolidge Bridge, connecting I-91 Interchange 18 (Northampton) with Route 47 (Hadley)	7,000	-3,000 (-7%)	N/A	N/A	N/A	N/A	N/A

[1] Expressed in vehicles per day

[2] Construction costs are for comparison purposes only, based on MHD 2002 unit prices. Estimates are not based on land survey and do not include land acquisition costs or design/permitting fees

Bridge Location 1

Bridge Location 1 provides a connection between Depot Road/Old Farm Road in Hatfield to Route 47/Comins Road in Hadley. This bridge is projected to carry 10,700 vehicles per day in 2025. The corresponding decrease in traffic on the Coolidge Bridge would amount to 3,600 vehicles per day – a 9 percent reduction. The demand shifts from the Coolidge Bridge would not fully address the congested areas along the Route 9 corridor. The demand shift is relatively low because the strong trip pairing between Northampton and Hadley/Amherst that relies on the Coolidge Bridge would not shift routes with a new crossing. From an engineering perspective, construction of this bridge would involve a long structure over the Connecticut River and adjacent floodplain areas and major upgrades to existing roadways.

- ➤ **Recommendation – Dismiss concept from further consideration**

Bridge Location 2

Bridge Location 2 provides a connection between I-91 Interchange 21 in Hatfield to Route 116 in Hadley. This bridge is projected to carry 12,000 vehicles per day in 2025.

The corresponding decrease in traffic on the Coolidge Bridge would amount to 6,800 vehicles per day – a 16 percent decrease. The demand shifts from the Coolidge Bridge would address the congested areas along the Route 9 corridor. Of the four bridges considered, Location 2 is forecast to have the highest demand. From an engineering perspective, construction of this bridge would involve a long structure over the Connecticut and Mill Rivers and adjacent floodplain areas and major upgrades to existing roadways.

Bridge Location 2 would impact wetlands (4.9 acres), floodplain areas for the Connecticut and Mill Rivers (20.1 acres), farmland/pastures (32.9 acres), and disturb rare species habitat. Bridge Location 2 would require many strip land takings and involve wholesale property takings to approximately 30 structures. Existing neighborhoods on Maple Street and Huntington Road could be impacted by the increased traffic and the resulting noise increases and air quality degradation. Bridge Location 2 could also potentially impact groundwater resource areas in Hadley. Location 2 passes through three historic districts – Hatfield Center Historic District, Elm Street Historic District, and Mill-Prospect Street Historic District.

Given the high environmental impacts, this bridge location should be discarded from further consideration. The traffic benefits do not justify the significant environmental and social impacts. Other infrastructure options studied, such as improvements to Route 9 or Interchange 19, provide comparable traffic benefits for a fraction of the cost and environmental impact.

- **Recommendation – Dismiss concept from further consideration**

Bridge Location 3

Bridge Location 3 provides a connection between I-91 Interchange 21 in Hatfield to Route 9 in Hadley. This bridge is projected to carry 10,800 vehicles per day in 2025. The corresponding decrease in traffic on the Coolidge Bridge would amount to 7,300 vehicles per day – a 17 percent decrease. The demand shifts from the Coolidge Bridge would address the congestion along the Route 9 corridor west of Mill Valley Road. Location 3 would require a grade-separated crossing of the Norwottuck Rail-Trail north of Route 9 and would introduce another 4-way signalized intersection on Route 9 at Mill Valley Road. From an engineering perspective, construction of this bridge would involve a long structure over the Connecticut and Mill Rivers and adjacent floodplain areas, along with a structure over the Norwottuck Rail-Trail. Location 3 would impact wetlands (4.4 acres) and floodplain areas (14.9 acres) for the Connecticut River and Mill River. Location 3 would also impact farmland (25.1 acres) and disturb rare species habitat. Bridge Location 3 would require many strip land takings and involve wholesale property takings to approximately 19 structures. Neighborhoods on Maple Street and Mill Valley Road would be impacted by the increased traffic and the resulting noise increases and air quality degradation. Location 3 passes through the Hatfield Center Historic District and the Elm Street Historic District.

Given the high environmental impacts, this bridge location should be discarded from further consideration. The traffic benefits do not justify the significant environmental and social impacts. Other infrastructure options studied, such as improvements to Route 9 or Interchange 19, provide comparable traffic benefits for a fraction of the cost and environmental impact.

- **Recommendation – Dismiss concept from further consideration**

Bridge Location 4

Bridge Location 4 provides a connection between I-91 Interchange 18 in Northampton to Route 47 in Hadley. This bridge is not feasible from an engineering design standpoint because of the proximity of Route 5 and the railroad at I-91 Interchange 18. Lowering the railroad is not practical because of the presence of floodplain in the area. In addition, the proximity of Route 47 to the Connecticut River would require a major realignment of Route 47 to accommodate the bridge connection given the elevation of the bridge compared to the elevation of Route 47. If this were a feasible location, the bridge would carry 7,000 vehicles per day in 2025. The corresponding decrease in traffic on the Coolidge Bridge would amount to 3,000 vehicles per day – a 7 percent decrease. Given the extent of floodplain east of Interchange 18 between the Mill River and the Connecticut River, this bridge location could require a very long viaduct over the floodplain area.

- **Recommendation – Dismiss concept from further consideration**

6.4 Transportation Demand Management Alternatives

As indicated in Chapter 5, the transportation demand management (TDM) options were focused on lower-cost actions that could address identified deficiencies without any structural or geometric improvements to the existing infrastructure. They included:

- Park and Ride Lots
- Route 9 Transportation Management Association/UMass TDM
- Transit Options
- Car Ferry Crossings
- Pedestrian/Bicycle Accommodations
- Intelligent Transportation Systems (ITS)

6.4.1 Park and Ride Locations

The locations considered as part of this study are described below. Utilization information is summarized in Table 6-4.

Table 6-4
Total Vehicle Reductions Resulting from Proposed Park and Ride Lots

Proposed Park and Ride Lot	Potential Market	Potential Transit Users or Carpoolers (one way)	Potential Peak Hour Vehicle Reduction[1]	Bridges Effected
Florence	7,200	145	90	Route 9
Mt. Tom	1,200	25	15	Route 9
Mt Sugarloaf/Interchange 24/ S. Deerfield[2]	3,800	75	45	Route 116
Sheldon Field/Damon Road[2]	8,900	180	105	Route 9

[1] Peak hour vehicle reduction represents the number of vehicles headed toward the Amherst/UMass area during the morning peak hour and away from the area during the evening peak hour.

[2] The potential market, users, and peak hour reduction identified represents the maximum attainment at one of the multiple locations listed.

Mount Tom/Oxbow Park

The origin-destination (OD) survey on the Coolidge Bridge was used to determine the potential market for this park and ride. Based on the OD survey, 1,200 vehicles (1,330 people) crossed the bridge from areas south and west of a potential Mt. Tom/Oxbow park and ride location destined to either Amherst or Hadley. If one percent of these people switched to transit and one percent switched to carpooling, a total of 25 daily vehicles would be removed from the Coolidge Bridge in either direction. People would probably not use a park and ride location near Mt. Tom/Oxbow to access transit because they would have to take bus B48 to Northampton Center and transfer to either bus M40 or B43 to get to Amherst or Hadley, which could greatly increase their trip time.

➤ **Recommendation – Dismiss concept from further consideration**

Florence

Based on the OD survey conducted at the Coolidge Bridge, 7,200 vehicles (8,000 people) traveling from areas north and west of the proposed park and ride location are destined to either Hadley or Amherst. If one percent of these people switched to transit and one percent switched to carpooling, a total of 145 daily vehicles would be removed from the Coolidge Bridge in either direction. Since people are required to transfer buses to reach Amherst or Hadley the one percent capture related to transit is unlikely, however, the location of Florence is desirable in that it has the potential to draw from towns to the west and the hill towns to the north.

➤ **Recommendation – Incorporate concept into Recommended Action Plan**

To the North

The potential market for any one of the three north park and ride locations (Deerfield Center, Mt. Sugarloaf, or Exit 24) is about 3,800 vehicles or about 4,180 people. If two percent switch to transit or carpool, 75 daily vehicles would be removed from the Sunderland Bridge in either direction. It is likely that a location at Mt. Sugarloaf would be better served by transit service, while a location at the Exit 24 interchange would better serve a rideshare mode. It should be noted that a park and ride facility has been previously proposed (and federal funding secured) in South Deerfield Center. Because of the constrained parking condition already occurring in the Town Center and the inability to enforce a time restriction at a park and ride facility, the Town is not supportive of a facility.

A park and ride location in Sunderland Center would have virtually the same potential market as the locations on the Deerfield side of the Sunderland Bridge. A lot at this location is beneficial in that it would not require modification of the Pink 31 or Green 46 bus routes and therefore would not require an additional scheduled bus. However, a "tripper" bus would be needed on the Pink 31 bus route to accommodate the additional bus ridership since the route is currently operating at or above capacity during the peak hour. A "tripper" bus is an unscheduled bus that appears in tandem with a scheduled bus to handle the anticipated increase in overflow riders. This bus would only be required twice during the morning peak hour and would likely not be required during the evening.

From a cost benefit perspective, a Sunderland Center park and ride lot would be most beneficial, however, VHB has not found a viable location for a park and ride service in Sunderland Center. Upon hearing the findings of this supplemental analysis, the SAG indicated it would be in the best interests of the study to recommend a facility on the Deerfield side of the Connecticut River, where some viable options for potential locations exist.

- **Recommendation – Incorporate concept into Recommended Action Plan**

Existing Park and Ride Service

With incentive programs, transit access, and signage, the usage of park and ride lots at Sheldon Field and Damon Road could be increased. Based on the OD survey, there are 8,900 vehicles (approximately 9,800 people) crossing the Coolidge Bridge from the west destined to Hadley or Amherst. If two percent of these people used the park and ride lots 180 daily vehicles could be removed from the Coolidge Bridge and Route 9 in each direction.

- **Recommendation – Incorporate concept into Recommended Action Plan.** The next step of this analysis should look into the feasibility of acquiring land adjacent to the current Damon Road facility to provide a single, expanded shared parking facility that can better accommodate both park and ride and bike trail users.

6.4.2 Route 9 TMA/UMass TDM

The Route 9 Transportation Management Association (TMA) was established in 1999 and included members such as the City of Northampton, U.S. Fish and Wildlife, Smith College, Cooley Dickinson Hospital, and UMass. Federal funding for the program expired in 2002. The TMA is no longer in operation.

However, UMass continues to run its own TDM program. Incentives offered by the University include carpool matching, parking discounts, salary based parking fees, preferred parking spaces, and the guaranteed ride home program. The number of UMass students and employees using the TDM program continues to increase annually although the total percentage of UMass employees who rideshare remain at less than five percent.

This alternative looked at the added benefit of reinstatement of the TMA and expansion of the current TDM programs would have on the Route 9 corridor. While some benefit would be realized, the previous programs do not show the ability to provide a substantial reduction in traffic in the Pioneer Valley.

- **Recommendation – This alternative could be pursued as part a separate study.**

6.4.3 Transit Improvements

To test most of the transit improvements, transit elasticity equations were applied to the existing ridership to calculate the change in ridership based on the transit improvement. Elasticity is defined as the percentage change in quantity resulting from a percentage change in a transit's characteristics. For example, a travel time elasticity of –0.5 means that a one percent decrease in transit travel time results in a 0.5 percent increase in transit ridership. The ridership results in this screening analysis assumed a range of elasticities that were calculated based on before and after studies. Table 6-5 shows elasticities used in this analysis. The sources used to compile these elasticities are as follows:

- The Transport Elasticities Database maintained by the Bureau of Transport Economics
- Richard H. Pratt, Traveler Response to Transportation System Changes, Interim Handbook, TCRP Web Document 12, DOT-FH-11-9579, 1999.
- Online TDM Encyclopedia produced by the Victoria Transport Policy Institute, Updated June of 2003, (www.vtpi.org\tdm)

In addition to the transit elasticities, a vehicle occupancy rate (VOR) of 1.1 (as determined through journey to work information[1]) was used for all alternatives.

Table 6-5
Transit Elasticities

Location	Range of Values
Transit In-Vehicle Travel Time	-0.6 to –1.16
Increase Service Frequency	-0.5 to –1.1
Service Improvement	-0.5

The following transit enhancements were considered as part of the preliminary screening analysis:

Route 9 Express Bus with Signal Preemption

Providing signal preemption to the express bus would minimize the amount of time the bus would be delayed at red lights along Route 9. However, once signal preemption has occurred, there is a potential to disrupt the coordinated signal system along Route 9. This disruption may affect the overall flow of traffic on the corridor. For this analysis it was assumed that providing signal preemption would result in travel time savings of about 15 and 25 percent. The upper limit is based on empirical data from Los Angeles[2]. Based on the 2001 PVTA Passenger Survey there are 450 daily riders on the Route 9 Express Bus. Bus signal preemption (using the above travel time elasticities and a travel time savings ranging between 15 to 25 percent) would result in an increase daily ridership of about 45 to 180 people.

Due to the frequent headways on the existing Route 9 bus service, a fully functional signal preemption system is not viable for the corridor. To allow for signal preemption on all buses, the roadways intersecting Route 9 at signalized locations would have their green signal eliminated approximately once every five minutes, or 12 times per hour. This disruption to the local feeder roadways would make it virtually impossible for vehicles to travel across Route 9 during the peak hours. As such, exclusive signal preemption was discarded from further consideration.

- **Recommendation – Dismiss concept from further consideration** (based on comments from the Study Advisory Group, this alternative was restructured as a Hybrid BRT (see below))

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[1] Although lower than the VOR established as part of the O-D survey, journey to work data is used to be consistent with the assumptions inherent in the transportation demand model.

[2] Eric Taub, *The New York Times*, September, 14, 2000, “*Rolling on: System Lets Traffic Lights Wave Buses Through*

Fixed Rail or BRT line along Route 9

Two capital-intensive transit alternatives – a bus rapid transit (BRT) or light rail system - were investigated as part of the screening process. Typically, these services run at operating speeds equal to the design speed of the dedicated busway or railway. A 40 mph operating speed was assumed for a dedicated bus lane adjacent to Route 9, based on the design speed of the corridor roadway. This BRT service could be as much as 40 percent faster than the current express bus along Route 9 via a new river crossing. BRT or light rail could also be accommodated on a new alignment north of Route 9 or on the existing Norwottuck Rail Trail. Assuming uninterrupted travel flow along this new alignment and a 40 mph travel speed, a 50 to 60 percent travel-time reduction could be realized.

As part of the analysis, it was assumed that these alternatives would possess the main features that define BRT and light rail systems –unique stops, off-vehicle fare collection, implementation of ITS technologies, frequent all-day service, and – most importantly – a dedicated right-of-way. However, BRT and light rail systems that boast these features are almost always located in highly populated areas and/or within commuting distance from major Central Business Districts (CBDs), neither of which is characteristic of the Pioneer Valley. In addition, with the provision of free bus service to the majority of the PVTA riders, a BRT fare system would likely discourage riders. Therefore, as expected, based on the elasticities defined in Table 6-6, ridership on a BRT service would be approximately 820 daily riders. This results in an increase of approximately 370 daily transit riders. It is assumed the BRT would replace the Route 9 Express Bus. A cost benefit analyses show that a BRT or light rail alternative on a newly constructed alignment (either adjacent to or separate from Route 9) would not generate the necessary ridership (in the Pioneer Valley) to justify the major construction cost, either in a dedicated right-of-way along Route 9 or on a separate alignment.

The project team also investigated the possibility of an electric trolley service along the Norwottuck Rail Trail. To analyze this service, VHB first reviewed the right-of-way present to support bi-directional trolley service (with or without maintaining the rail trail). The Norwottuck right-of-way (ROW) varies from just under 50 feet to 82.5 feet, although there are numerous encroachments along its entire length. In most cases, the trail is centered within the ROW. As envisioned, the trolley would utilize the Norwottuck alignment for a distance of approximately 4.1 miles from Damon Road to the vicinity of the Route 116/Route 9 intersection (in Hadley) where it would depart to the north along the Route 116 corridor to UMass. ROW acquisition would be required along the entire length of the corridor if trail use were to remain. If the trail were abandoned, ROW acquisition would be needed over approximately 40 percent of the corridor. Particularly constrained areas of ROW include areas adjacent to East Street, just west of Route 47, West Street, and Cross Path. A new bridge over the Connecticut River would be required to accommodate the trolley service. New structures would also be required at Route 9 and Spruce Hill Road. As a result of the infrastructure requirements, a trolley service along the

Norwottuck Rail Trail would range from $20 to $25 million to construct ($2 to 3 Million per mile and $ 14 Million for the structures).

VHB also analyzed the potential ridership of this service. The ridership expected on the electric trolley is about 1,000 person trips per day. Considering the 1.1 VOR, this is equivalent to approximately 900 daily vehicle trips or 90 peak period trips potentially removed from the Route 9 corridor each day. These ridership estimates are still not strong enough to warrant the cost associated with this improvement.

Based on comment from the Study Advisory Group, a new alternative – a hybrid BRT service – was developed and analyzed. This system would run with the existing bus service (within traffic along the current Route 9 service corridor) but would have the advantage of queue bypass lanes at certain signalized intersections. This service would stop at red traffic signals but have a dedicated lane at the signal in which they could bypass passenger cars as the signal turns green. A limited signal preemption system would be used during the peak hour in the peak direction to maintain the bus schedule. If the bus were running on schedule, the operator would not be permitted to use the signal preemption system. The service would have other enhancements traditional to a BRT System, such as an advanced ITS communication system, improved facilities, clean fuel buses, more direct and frequent service, and potential connections to park and ride locations.

The hybrid system analyzed assumes that the BRT would operate as a regular bus making normal stops to the west of Northampton Center and to the east of the University of Massachusetts. Once the bus enters the "BRT system" it would have five stops along Route 9 - Northampton Center, Damon Road, Hadley Town Hall, the Route 9 shopping area, and UMass. Special bus shelters, as the one shown below, would denote these locations.

Using the existing ridership on the local and express Route 9 buses, a combination of 1990 and the available 2000 US Census journey to work data, and the PVPC travel demand model (adjusted to represent 2025 baseline conditions), VHB estimated the potential increase in ridership a hybrid BRT service could generate between Northampton Center and the University of Massachusetts. The analysis shows that ridership could increase by about 525 person trips per day. Considering the 1.1 VOR, this is equivalent to approximately 475 daily vehicle trips or up to 50 peak period trips potentially removed from the Route 9 corridor each day.

Although this service would achieve some reduction in travel time, the main goal of the PVTA is for the service to greatly increase schedule adherence, thereby reducing annual operating costs. While these services would result in an increase in ridership, that ridership is expected to only marginally reduce traffic congestion during the peak commuting periods. However, this alternative, combined with other improvement options, could address the overall goals of this study. Therefore it is recommended that the existing Route 9 bus system be slowly converted into a hybrid bus service and the existing bus route be extended to the west. Conversion of the system would cost about $8,000,000 to $10,000,000.

- **Recommendation – Incorporate concept into Recommended Action Plan**

Increased bus service to shopping malls

Route B43 currently stops on Route 9 at the entrance to the Mountain Farms Mall and the Hampshire Mall, however, for westbound transit riders crossing Route 9 is very difficult. If the westbound buses could turn left onto Maple Street, loop, and turn left back onto Route 9, people would be more likely to use the bus to travel to and from the mall. Assuming entering the mall enhances bus service by 10 to 20 percent and that entering the mall would add an average of 2.5 minutes to the bus travel time (5 minutes westbound and 0 minutes eastbound) an increase in daily ridership of about 100 passengers would be expected.

- **Recommendation – Dismiss concept from further consideration**

Increased north/south bus service

The results of the origin/destination survey on the Sunderland Bridge (Table 6-6) indicate that there is a market for increased bus service from Greenfield, Deerfield, Shelburne, Turner Falls and South Deerfield to Sunderland and Amherst

Table 6-6
Vehicle Trips to Sunderland and Amherst from the North (Sunderland Bridge EB)

Origin	Number of Trips to Sunderland	Number of Trips to Amherst
Shelburne	0	175
Greenfield	325	680
Turner Falls	15	70
Deerfield	135	350
South Deerfield	425	675
Total Potential Market (Vehicles)	**900**	**1,950**
Total Potential Market (Persons)[1]	**990**	**2,145**
Percent Capture	**2%**	**2%**
Increase in Ridership (one-way)	20	40

1 Assumes a Vehicle Occupancy Ratio (VOR) of 1.1 based on journey to work data.

If the frequency of the Greenfield as well as the frequency of the South Deerfield bus were increased and if park and ride lots were available along these routes transit ridership would increase. "New bus service in a community typically achieves 3 to 5 annual rides per capita"[3] which translates into about a 1 to 2 percent capture rate. Daily transit ridership would increase by about 125 people (63 each way). The increase in transit riders does not include any increase due to new park and rides.

If park and ride lots were also introduced in South Deerfield, Exit 24 Truck Stop or Mt Sugarloaf the ridership would increase further. Based on the OD survey there are 615 vehicles that travel from the north to Amherst or Sunderland that are not within the towns listed in Table 6-6. If two percent of these riders were captured, the daily transit ridership would increase by an additional 25 people. For a total daily increase in transit ridership of 150 people.

The 1990 Journey to Work data indicates that there are 1,880 people traveling in vehicles from the north to Sunderland or Amherst. If park and ride lots with transit availability are made available and if two percent of these riders were captured, the daily transit ridership would increase by 40 people one way or 75 total daily work trips. This would be equivalent to less than 40 additional riders per peak hour.

By providing an additional bus, hourly service could be provided from 6:00 AM to 8:00 PM on the GMTA Amherst bus. This service would run 215 normal schedule days and 141 reduced schedule days (based on the 2002/2003 PVTA bus schedule). An additional bus on the PVTA Green 46 route would also allow hourly service from

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[3] Online TDM Encyclopedia produced by the Victoria Transport Policy Institute, Updated June of 2003, (www.vtpi.org\tdm)

6:00 AM to 8:00 PM on normal operating service days. Reduced schedule ridership for this bus can be accommodated by rerouting the reduced schedule GMTA bus through South Deerfield and combining services.

- **Recommendation – Incorporate concept into Recommended Action Plan** (with the construction of a park and ride lot in Franklin County)

Other Transit Enhancements

Other desirable transit options that would improve upon existing services include:

- Increased bus service between Holyoke and the Universities
- Service coordination between PVTA, FRTA, and GMTA
- Extended night service

While these enhancements may be worthwhile service improvements to the Pioneer Valley, they are expected to generate low ridership and have no significant impact on peak period study area congestion.

- **Recommendation – Dismiss concept from further consideration**

6.4.4 New Ferry Crossings

The methodology of selecting ferry-crossing locations involved identifying the desired travel patterns established through the 2002 origin-destination survey, identifying logical connections across the river, reviewing all the environmental constraints, and developing potential crossing locations which would be supported by the existing infrastructure. Should ferry service be pursued, it is likely a barge and tugboat system could be needed. Similar services run across Lake Champlain between Fort Ticonderoga, New York and Shoreham, Vermont and across Shelter Island Sound between Shelter Island and Sag Harbor, New York. It was assumed that two vessels would be needed to support the service.

Three river crossings were evaluated as potential ferry crossings. These locations are identical to bridge crossing locations one, two, and four as depicted in Chapter 5. Location 3 was not evaluated because it is identical to Location 2 in the vicinity of the river crossing. Table 6-7 summarizes the forecasted demands and effects on the Route 9 Coolidge Bridge. These demands were estimated based on the capacity of the operating system (8-10 vehicles), the number of ferries in operation (two), the wait time for service (3 minutes), and the travel time to cross the river (3 minutes at 5 mph). It is assumed that the access roads to the ferry are identical to the access roads proposed for a new bridge.

As Table 6-7 indicates, the two locations north of the Coolidge Bridge are expected to attract 950 – 2,200 vehicles per day (based on 6 minute and 3 minute waiting times, respectively), with approximately 10 percent of those occurring during the peak hours. Half of the expected trips will be diverted from the Coolidge Bridge. It is important to note that there is an imbalance in ferry trips, with the eastbound daily trips approximately twice the westbound daily trips.

Trip estimates were not developed for a crossing to the south of the Coolidge Bridge (Location 4). Based on the traffic volumes projected for the bridge crossing locations, this crossing would attract the fewest trips. In addition, this location was determined to be infeasible from an engineering design standpoint.

Table 6-7
New River Crossings Studied (Ferry Alternative)

Location		3-minute wait time		6-minute wait time	
		2025 Ferry Demand (Vehicles Per Day)	2025 Demand Reduction[1] (Vehicles Per Day)	2025 Ferry Demand (Vehicles Per Day)	2025 Demand Reduction[1] (Vehicles Per Day)
Location 1	North of the Coolidge Bridge, connecting Depot Road/Old Farm Road (Hatfield) with Comins Road/Route 116 (Hadley)	2,000	1,000	950	425
Location 2	North of the Coolidge Bridge, connecting Maple Street/Bridge Lane (Hatfield) with Huntington Road (Hadley)	2,200	1,100	1.250	625
Location 4	South of the Coolidge Bridge, connecting I-91 Interchange 18 (Northampton) with Route 47 (Hadley)	INFEASIBLE	INFEASIBLE	INFEASIBLE	INFEASIBLE

1 Estimated demand reduction on Coolidge Bridge
Note: Peak hour demand reduction can is approximately 10 percent of the daily demand.

A review of river conditions at each of the locations indicates that the Connecticut River does not have significant depth to run most ferry services. The depth of the river through this area is controlled by Greenfield Electric Light and Power Dam and is often only a few feet through the Hatfield, Hadley, and Northampton areas. Another significant obstacle to the viability of ferry service is the likely inability to keep the service operational during the winter months. The projected utilization compared with the capital and operating issues and costs associated with the ferry service make this an infeasible alternative to address study area east/west travel needs.

- **Recommendation – Dismiss concept from further consideration**

6.4.5 Pedestrian/Bicycle Improvements

A screening analysis was conducted for the following pedestrian and bicycle enhancements.

Increased maintenance of Norwottuck Rail Trail

While not expected to show a substantial reduction in peak hour traffic within the study area, better maintenance of the Norwottuck rail trail, particularly during the winter months would encourage more users to choose the trail over their current mode of transportation. Independent of this study, volume counts conducted by PVPC during the late 1990s (from July to November), show that approximately 40 to 50 people used the trail for commuting in the morning and evening peak hours. If half of these people would use the trail year round if it were maintained, the 18 to 22 vehicle trip reduction will have no significant impact on east/west travel along Route 9.

- **Recommendation – Dismiss concept from further consideration**

Widening Norwottuck Rail Trail

In 1999, AASHTO guidelines were revised to recommend a 10-foot minimum width for bike trails. Currently at eight feet, it is difficult for the rail trail to accommodate a variety of users. Widening the trail would provide the room and margin of comfort necessary for commuter and recreational bicyclists, walkers, and roller bladers. Planning for this improvement will ensure the long-term viability of the corridor.

- **Recommendation – Incorporate concept into Recommended Action Plan**

Route 9 on-road bicycle lanes

Provision of bike lanes on Route 9 would provide bikers with safer accommodations to commute to and from work along Route 9 traffic. However, the creation of these lanes would have substantial right-of-way and/or shoulder impacts throughout the corridor. As such, the use of the Norwottuck Rail Trail (which runs parallel to Route 9 with a direct connection to UMass) should be encouraged in preference to on-road bicycle lanes.

- **Recommendation – Dismiss concept from further consideration**

Route 116 on-road bicycle lanes (Amherst to Sunderland)

Based on Federal Highway (FHWA) guidelines for rural highways with operating speeds between 40-50 mph and traffic volumes greater than 2,000 vehicles per day, a six-foot shoulder is recommended to accommodate bicycles. As full shoulders exist along the entire Route 116 corridor (between Sunderland and Amherst), no action needs to be taken.

- **Recommendation – Dismiss concept from further consideration**

6.4.6 Area Wide ITS

There are several Intelligent Transportation Systems (ITS) projects currently on going in Western Massachusetts. MassHighway and the PVTA have released new or updated deployment plans for ITS deployment throughout the I-91 corridor. In addition, as part of the MassHighway program, the University of Massachusetts is undertaking a demonstration project on Routes9 and 116. This alternative considers whether ITS might have a continuing role in addressing some of the study area's traffic management needs.

The I-91 Corridor has been identified by MassHighway as a major corridor that would benefit greatly from deployment of a comprehensive Intelligent Transportation System (ITS). It is envisioned that ITS improvements throughout the study area could aid drivers in making decisions about their travel route and travel time. Advanced traveler information on congestion may persuade drivers to seek alternate routes, alternate travel times, or different modes of transportation.

In 1998, MassHighway, in partnership with the PVPC and supported by FHWA, completed the ITS Early Deployment Planning Process and Strategic Plan for the Pioneer Valley. This initial plan prioritized ITS technologies for the region and led to the successful deployment of the Coolidge Bridge Advanced Traffic Management System (ATMS – District 2 Regional Traffic Operations Center (RTOC)), UMass Regional Traveler Information Center (RTIC), and the Route 2 Traveler and Tourism Information System. This strategic plan was reassessed in January 2003 for application to the I-91 corridor from the Connecticut to the Vermont State Line, and the following ITS technologies were recommended for implementation within this study area:

- **Dynamic Message Signs (DMS)** – to provide motorists with timely, reliable, and useful travel information so they can make informed decisions about changing travel routes. Thirteen portable DMS have been recommended along I-91, several within the study area. Particularly effective portable signs will eventually be replaced by permanent DMS.
- **Vehicle Detection System** – to provide presence, volume, lane occupancy, and speed information on the traffic characteristics of the corridor. A few test locations are currently identified along the I-91 corridor and will be refined as part of a comprehensive design study.
- **Closed Circuit Television Cameras (CCTV) –** to provide visual verification of incidents and potentially detailed information for incident response. MassHighway has identified nine potential coverage areas, some within the study area**.**
- **Regional Traffic Operations Center (RTOC) –** The center is now housed at the District 2 MassHighway office in Northampton, and has been used for monitoring the Coolidge Bridge rehabilitation project. Direct communications

are established via a combination of fiber and microwave technology. Expansion plans include incorporating new ITS infrastructure into the RTOC, and eventually tying into the Boston RTOC to allow for back-up and off-hour operation. A separate connection to the University of Massachusetts based Regional Traffic Information Center provides regional management and coordination between users, agencies, and other transportation systems associated with ITS.

The I-91 corridor ITS project from the Connecticut to the Vermont State Line is currently under design for the deployment of fiber optic cable for the full length of the Interstate. The project, broken into two segments (Connecticut to Northampton, and Northampton to Vermont), is in the early stages of design. Immediate plans include flying the corridor to develop photogrammetry to be used for the development of detailed base plans.

The regional ITS program would also incorporate an incident management system that would implement an operations plan in the event of an emergency. Such a plan maximizes motorists' safety and travel efficiency through incident prevention, timely response, site clearance and motorist information.

Regional Transportation Information Center (RTIC)

As part of a memorandum of understanding (MOU) between the University of Massachusetts and MassHighway, the RTIC program was established and is housed at the UMass Transit Complex. The purpose of this center is to collect, interpret, and disseminate traffic, tourist, and traveler information. The MOU anticipates the following sources of information will be accessed:

- Coolidge Bridge ATMS – Traffic condition data and information regarding actions taken by MassHighway to mitigate traffic impacts of reconstruction activities.
- Travel time and traffic condition information developed as part of the University’s video-based automated monitoring system on Route 9 and Route 116.
- Bus transit route, schedule, and related information provided by UMass Transit and Five Colleges, Inc.
- On-campus parking conditions provided by UMass Parking Services
- Information regarding special events on campus such as Commencement Activities, basketball games, etc. provided by the appropriate University office.
- Traffic, weather, transit, and traveler information provided by the Route 2 Corridor Traveler Information Service for Central and Western Massachusetts.

The University will interpret and integrate this information as follows:

- Via electronic link to MassHighway District 2 offices
- Via internet link to general public
- Via electronic link to the information kiosks established as part of the Route 2 service
- Via spot broadcast over the University's AM and FM radio stations
- Via electronic means to the PVPC for dissemination to media outlets
- Via electronic means to the FRCOG for dissemination to media outlets
- By other means as appropriate within the project budget and scope.

The RTIC will also be used to receive and disseminate information for the UMass Advanced Traveler Information System (ATIS) for Route 9. This system uses automatic license plate readers to provide up to the minute travel time information for westbound travel to the Coolidge Bridge. An automated traffic-monitoring camera also provides continuous, real-time measures of westbound travel. A website has been created to disseminate this information.

The ATIS system is being evaluated for the potential to include eastbound travel time on Route 9 as well as north/south travel time along Route 116 between South Deerfield and the Amherst/Sunderland Town Line. Over the longer-term, it is envisioned that this information would provide travelers with comparative travel times on each of these critical routes to help them choose the appropriate route.

Future ITS endeavors

It is anticipated that the RTIC, in cooperation with the RTOC, will continue to function as a test bed for emerging ITS technologies in the Pioneer Valley. RTOC is evaluating the potential for installing permanent remote sensors that provide traffic stream parameters leading to the determination of traffic characteristics. Additionally, RTIC is evaluating using other technologies to provide travel times on alternate routes in the greater Amherst area, which would complement the existing Route 9 machine-vision based travel time system.

The vision of the RTIC is to continue to function as a clearinghouse for travel information, thereby providing as much information over as broad an expanse as possible including future connections with the Route 2 travel information system and complementing the developing Massachusetts statewide 511 system. The RTOC will continue to reach out beyond its immediate geographic area to assist in the development of a collaborative, comprehensive regional intelligent transportation system.

ITS Transit Improvements

In May 2003, the Pioneer Valley Transit Authority (PVTA) released its final report on ITS architecture and deployment. The PVTA has developed this plan to provide a project-based approach for implementation of the recommended ITS system for public transportation over a 10-year period.

In 1998, the PVTA took part in a steering committee for transportation needs in the Pioneer Valley and how they could be met using ITS technologies. From this study, a series of transportation needs were identified. Of those needs identified, four targeted transit technology initiatives:

- Improved fare-box technology
- Improved ridership data collection and analysis
- Installing Automatic Vehicle Location Systems (AVL) for vehicle tracking
- On-board surveillance to improve passenger safety

An additional nine User Service enhancements were identified. These services are similar to those included in the National ITS architecture:

- Route Guidance
- En-route Driver Information
- En-Route Transit Information
- Public Transportation Management
- Personalized Public Transit
- Public Travel Security
- Electronic Payment Service
- Commercial Fleet Management
- Emergency Notification and Personal Safety

Strategic Development Plan

Based on these identified needs, the strategic plan presents eight recommended transit projects to be implemented in one of four time frames – early deployment (by 2000), short-term deployment (2000-2005), medium-term deployment (2002-2007), and long-term deployment (2008-2018). The Strategic Deployment Plan for ITS Transit Improvements is identified in Table 6-8.

Table 6-8
Proposed ITS Strategic Deployment Plan

Proposed Project (1998)	Objectives	Capability and Coverage	Lead Agency	Deployment Time Frame
PVTA Transit Information System (Demonstration)	Gather and provide real-time transit information Demonstrate effectiveness of AVI-based system	Kiosk, telephone, and website information dissemination Static information on schedule/events Real time information based on AVL data Focus on Northampton/ Amherst area	PVTA	Early
Multi-Modal Regional Traveler Information – Phase I	Allow Springfield Area travelers to access traffic and transit information	Feed transit and traffic information to a variety of telecommunications media	To be determined	Short
Traffic and Transit Stop Video Surveillance	Provide video surveillance in urban areas	Video monitoring of critical intersections or transit stops Image processing of traffic data Image sharing with law enforcement	PVTA City of Springfield	Short
PCTA Transit Stop Information System	Provide information on bus network Provide estimated time of arrival	Builds on AVL system Provides static and dynamic information Install touch screens at key stops and phone systems at other locations	PVTA	Medium
PVTA AVL System	Optimize fleet management and provide real-time transit information	Phased system starting with trunk routes Ability to re-route in real time Feeds into information system Interfaces with paratransit system and private carriers	PVTA	Medium
Multi Regional Traveler Information System – Phase II	Expand upon Phase I ITS capability	Integrate additional capabilities and geographic coverage	To be determined	Medium
Regional Integrated Fare Collection System	Automate and integrate fare collection mechanisms	One smart card for toll, parking, transit, etc. Allow for promotional discounts, private partnering	To be determined	Long
Wide Area Traffic and Transit Management	Use a variety of ITS technologies for transportation system management	Utilize PVTA AVL data for travel time measurement Exchange incident, congestion, and travel time information between agencies	MassHighway	Long

The PVTA has made progress toward deploying the early and short-term projects and most of the recommended projects remain a priority. However, there have been changes to the PVTA organization that must be taken into account within the ITS architecture. These include but are not limited to:

- Development of multi-modal facilities in Springfield Westfield, and Holyoke
- Increased priority of security and emergency preparedness
- Opportunity for integration presented by UMass Regional Transportation Information Center (RTIC)
- Increased importance of conducting transit operations in an efficient and cost effective manner.

Implications of ITS on the Study Area

There have been many studies that have evaluated the potential benefits of ITS implementation on regional transportation systems. The generally acknowledged benefits include:

- Ability to improve detection and response to national emergencies and natural disasters;
- Ability to effectively handle congestion during periods of recurring congestion and during incidents; and
- Ability to improve regional travel safety and conditions.

The actual effectiveness of ITS on any of these measures varies significantly by location.

Funding for the ITS program has yet to be secured, however, the region is in the process of seeking federal funding through the Congestion Management and Air Quality (CMAQ) program and other programs. While ITS deployment is not expected to have a significant impact on the reduction of vehicle trips in the study area, it can provide valuable information to motorists before and during their trip to help alter trip time and routes as appropriate, and help extend the useful life and health of the transportation system.

6.4.7 Analysis of Overall TDM/Transit Potential

The preliminary screening analysis options showed that individual TDM options will not address the east/west congestion issues in the study area. A second level analysis examined whether or not a package of TDM options could compliment each other to form effective alternatives to reduce congestion. The supplemental screening analysis considered two "TDM package" alternatives. These composite improvement packages were evaluated on how they could address study area transportation needs as a whole, independent of structural improvements to the transportation system. It is possible some package components could be short-term improvements while others are medium or long-term improvements. It is also possible that these packages could be combined with infrastructure improvements within the overall recommended improvement plan. The following summarizes the packaged alternatives considered:

TDM Package 1

- Park and Ride locations
  - Upgrade and consolidation of the existing facilities (Damon Road and Sheldon Field)
  - New facility in Florence
  - New facility in South Deerfield/Sunderland
- Increased north/south bus service with connection to Deerfield park and ride
- Regional Transportation Information Center (RTIC)
- Fixed route automatic vehicle location (AVL) deployment
- Advanced passenger information system

TDM Package 2

- TDM Package 1, *plus*
- Enhanced BRT line from Damon Road park and ride to UMass/University Drive

Table 6-9 presents the anticipated cumulative benefits of the packaged alternatives. In many cases, the expected vehicle trip reduction of each component (as presented in the preliminary screening section) is added to reflect the overall expected trip reduction. As the table indicates, some reduction in congestion can be realized with a package of TDM alternatives. Combined with potential TSM alternatives, the congestion reduction in the study area could be significant.

Table 6-9
Package Alternative Cumulative Benefits

Improvement Package	Increase in Intersection Capacity	Increase in Roadway Capacity	Potential Daily Decrease in Vehicles (Route 9)	Potential Daily Decrease in Vehicles (Route 116)	Potential Daily VMT Reduction[1]
TDM Package 1	Minimal	Minimal	645	285	8,600
TDM Package 2	Minimal	Minimal	1,200	285	13,800

1. VMT - Vehicle Miles Traveled

Of specific note is the ability of TDM package 2 to remove approximately 1,200 daily vehicle trips from the Route 9 corridor and the Coolidge Bridge. The infrastructure analysis performed does not take into account the reduction of trips due to transit enhancements and TDM. Although the congestion can be appropriately mitigated with the infrastructure improvements recommended, TDM package 2 has the ability to further increase capacity along the Route 9 corridor. Combined with a strategic corridor preservation plan along Route 9, these actions have the ability to maintain acceptable traffic operations along the corridor well into the future.

6.5 Recommended Improvement Plan

The screening analysis process described in this chapter led the project team to a list of recommended action items (see Chapter 7). These items were reviewed and generally supported by the Study Advisory Group and presented to the public. Based on future traffic projections and the lengthy permitting process some of these alternatives would undergo, a timeframe of implementation was also established. This timeframe could be subject to change based on a number of variables, including unexpected growth throughout the region, especially within the already congested areas of Route 9 and UMass. It is recommended that the various municipalities and stakeholders involved move immediately to further refine the implementation plan to address the identified transportation needs of the region.

7.0 Recommended Improvement Plan

Based on the screening analyses and input from the Study Advisory Group, the project team categorized the recommended study area improvements into a Recommended Action Plan. Recommended improvements are those that best address deficiencies within the study area, satisfy the evaluation criteria, and seek to minimize environmental and social impacts.

The Recommended Action Plan includes varying approaches to address the existing and future transportation needs identified. Each recommendation has been prioritized as a short, medium, or long-term action item for implementation. The approximate timeframe utilized for the recommendations was as follows:

➤ Short-term Action:	0 to 5 Years
➤ Medium-term Action:	5 to 10 Years
➤ Long-term Action:	10 to 20 Years

7.1 Short-Term Recommendations

Short-term recommendations include actions that address existing safety and operational deficiencies to the transportation infrastructure within the study area. For the most part, these improvements include low-cost options that can be implemented in a short timeframe (0 to 5 years), and with less effort, such as signal timing and phasing changes, signal installation, and roadway restriping. Figure 7-1 shows the recommended short-term actions throughout the Study Area. The short-term recommendations are as follows:

- Begin implementation of recommended travel demand management (TDM) options (including three park and ride locations, increased bus service, and ITS measures)
- Begin Route 9 Corridor Preservation Plan Study
- Implement transportation systems management (TSM) improvements at the following locations:
    - Route 116 at River Road (Concept 1, Deerfield)
    - I-91 Interchange 19 northbound on-ramp at Route 9 (Concept 4, Northampton)

  - Route 5 at Route 202/Lincoln Street (Concept 8, Holyoke)
  - Route 116 at Bay Road (Concept 9, Amherst)
  - Route 116 at Route 47 (Concept 7, South Hadley)
  - Route 116 at Sunderland Road (Concept 19, Amherst)

In addition, the permitting and design process for the medium and long-term improvements should begin. Table 7-1 presents the cost estimates associated with the short-term improvements.

Table 7-1
Short-Term Recommended Improvement Costs[1]

Short-Term Improvements	Estimated Construction Cost[2]
• TDM Options (including transit enhancements)	Variable
• ITS Options	Variable
• Route 116/River Road Improvements	$25,000
• Signalize I-91 Interchange 19 On-Ramp at Route 9	$150,000
• Signalize Route 5 at Route 202	$150,000
• Signalize Route 116/Bay Road	$175,000
• Signalize Route 116/47	$175,000
• Route 116 intersection improvements at Sunderland Road	$5,000
• Route 9 Corridor Preservation Plan	$100,000
Total Short-Term	**$780,000[3]**

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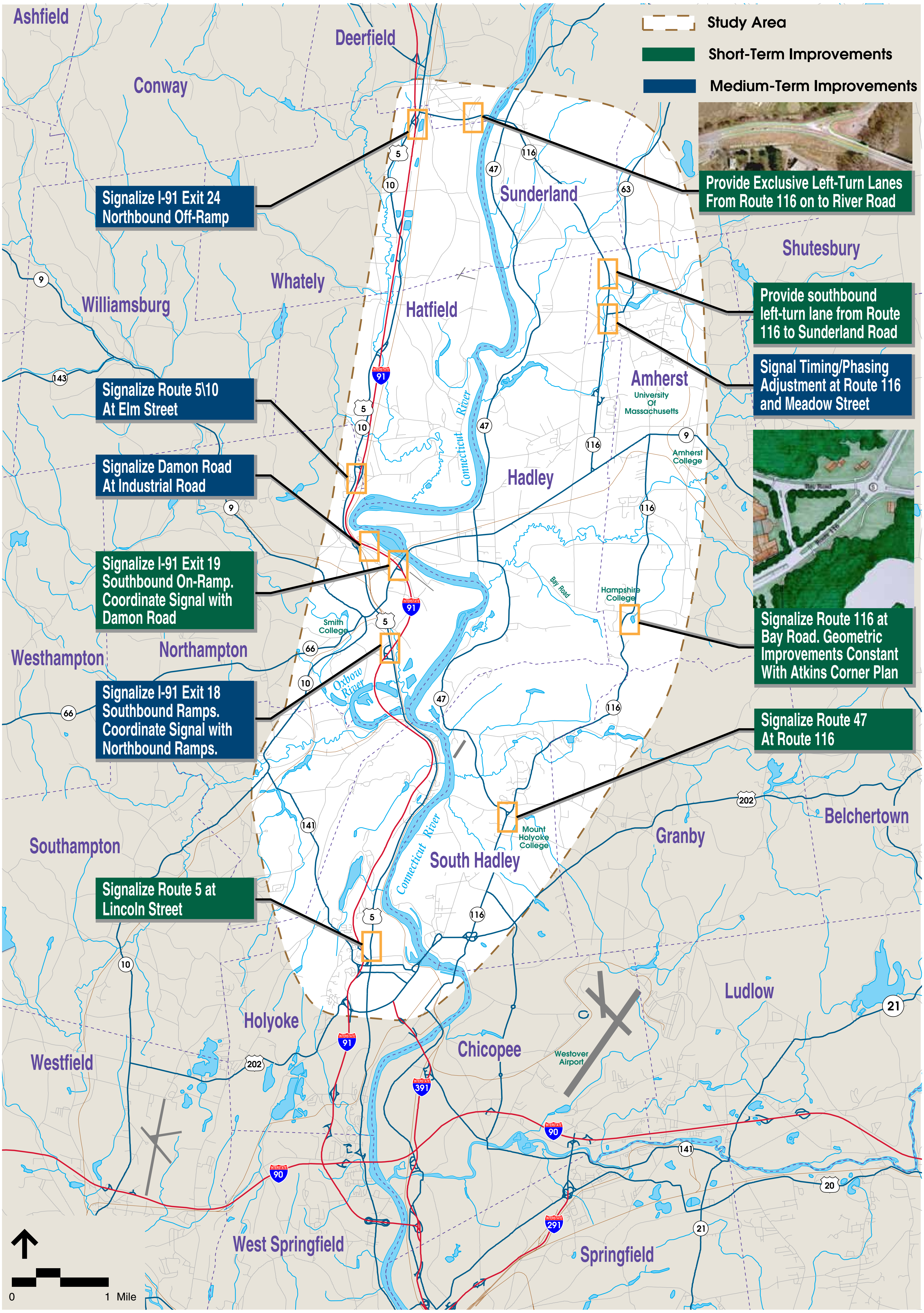
1 Costs are exclusive of permitting and design fees and right-of-way or land acquisition fees
2 MassHighway 2002 unit prices were used to develop cost estimates
3 Plus the cost of TDM and ITS options chosen to move forward in the short-term



Signalize I-91 Exit 24 Northbound Off-Ramp

Signalize Route 5\10 At Elm Street

Signalize Damon Road At Industrial Road

Signalize I-91 Exit 19 Southbound On-Ramp. Coordinate Signal with Damon Road

Signalize I-91 Exit 18 Southbound Ramps. Coordinate Signal with Northbound Ramps.

Signalize Route 5 at Lincoln Street

Provide Exclusive Left-Turn Lanes From Route 116 on to River Road

Provide southbound left-turn lane from Route 116 to Sunderland Road

Signal Timing/Phasing Adjustment at Route 116 and Meadow Street

Signalize Route 116 at Bay Road. Geometric Improvements Constant With Atkins Corner Plan

Signalize Route 47 At Route 116

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Figure 7-1
Proposed Improvements

(Short and Medium-Term)

7.2 Medium-Term Recommendations

Also presented in Figure 7-1, Medium-term recommendations include improvements that focus on the near-term future transportation infrastructure needs, have a longer permitting and design process, and can be more costly. It is anticipated that these recommendations would be carried forward in a 5 to 10 year timeframe. The Medium-term recommendations are as follows:

- Implement TSM improvements at the following locations:
    - I-91 Interchange 24 northbound off-ramp at Route 5/10 (Concept 2, Whately)
    - Route 5/10 at Elm Street/Allen Road (Concept 3, Northampton)
    - I-91 Interchange 18 southbound ramps at Route 5/10 (Concept 5, Northampton)
    - Damon Road at Industrial Road (Concept 6, Northampton)
    - Route 116 at Meadow Street (Amherst)
- Completion of TDM options
- Interchange 19 Signal System/Ramp Improvements (Concept 13, Northampton)
- Route 116 intersection improvements at Meadow Street and Sunderland Road (Concept 19, Amherst)
- Begin permitting and design process for long-term improvements

Table 7-2 presents the cost estimates associated with the medium-term improvements.

Table 7-2
Medium-Term Recommended Improvement Costs[1]

Medium-Term Improvements	Estimated Construction Cost[2]
- TDM Options (including transit enhancements)	Variable
- ITS Options	Variable
- Signalize I-91 Interchange 24 Off-Ramp at Route 5/10	$150,000
- Signalize Route 5/10 at Elm Street	$150,000
- Signalize I-91 Interchange 18 southbound ramps at Route 5/10	$150,000
- Signalize Damon Road at Industrial Road	$150,000
- Interchange 19 Signal System/Ramp Improvements	$3,500,000
- Route 116 intersection improvements at Meadow Street	$5,000
Total Medium-Term	**$4,105,000[3]**

1 Costs are exclusive of permitting and design fees and right-of-way or land acquisition fees
2 MassHighway 2002 unit prices were used to develop cost estimates
3 Plus the cost of TDM and ITS options chosen to move forward in the medium-term

7.3 Long-Term Recommendations

Long-term recommendations include actions that may not be necessary under existing conditions, but will be needed to handle future roadway demands. These recommendations are capital intensive and often take longer periods of time to design, fund and construct. It is anticipated that these projects would be carried forward in a 10 to 20 year timeframe. Figures 7-2 and 7-3 show the recommended long-term actions throughout the Study Area. The long-term recommendations are as follows:

- Concept 15 – Improve Interchange 19 with reconfigured ramp connections that would make the interchange fully directional (Figure 7-2)
- Concept 18 - Widen Route 9 to four lanes from Route 47 to North Maple Street in Hadley (Figure 7-3).

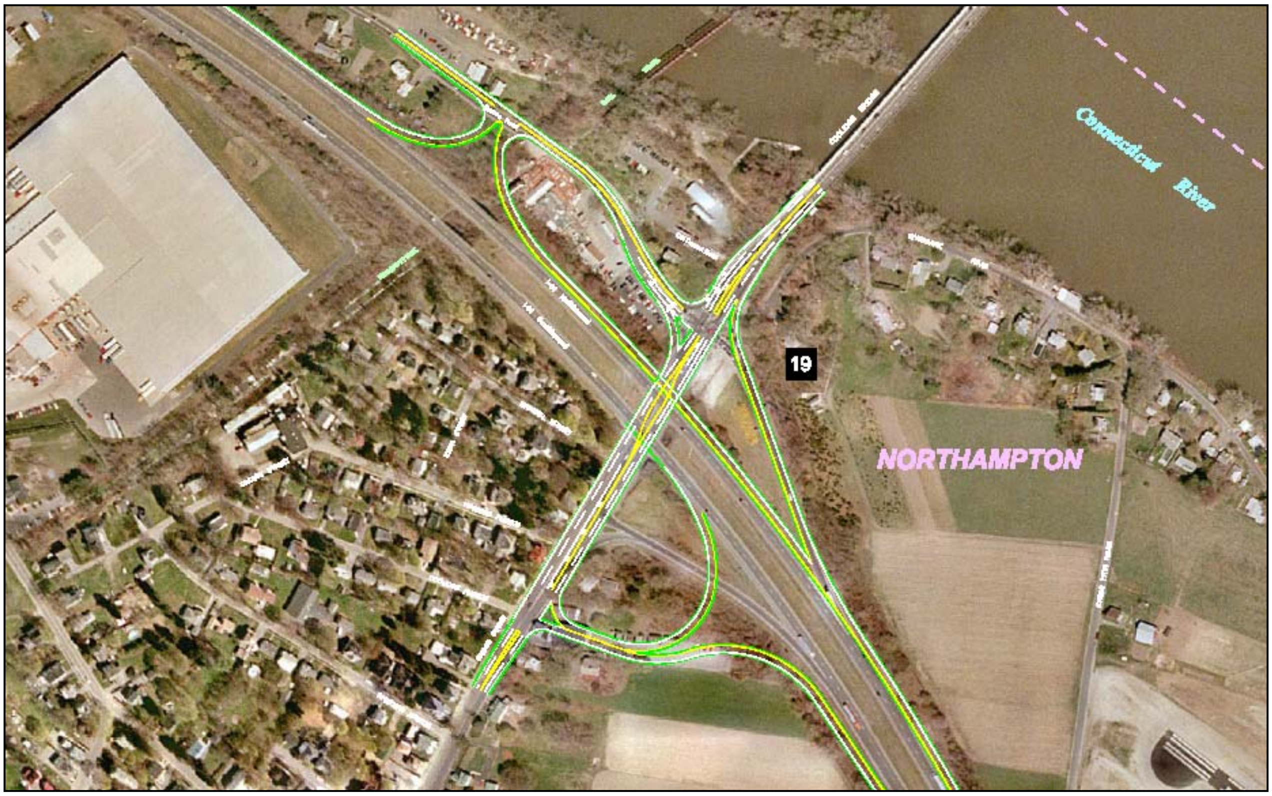
Table 7-3 presents the cost estimates associated with the long-term improvements.

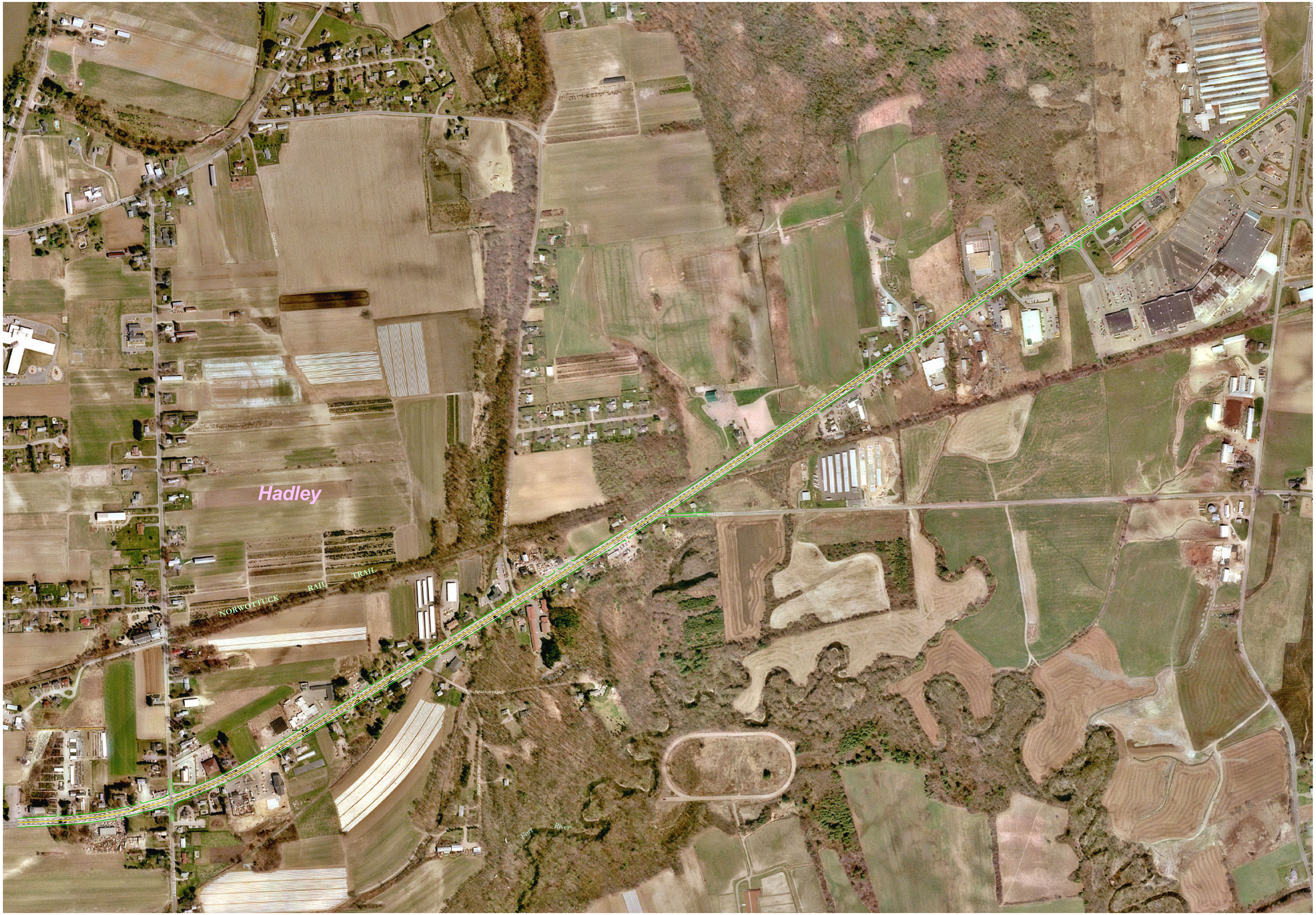
Table 7-3
Long-Term Recommended Improvement Costs[1]

Long-Term Improvements	Estimated Construction Cost[2]
• I-91 Interchange 19 Improvements (fully directional)	$8,400,000
• Route 9 Widening	$4,200,000
Total Long-Term	**$12,600,000**

1 Costs are exclusive of permitting and design fees and right-of-way or land acquisition fees
2 MassHighway 2002 unit prices were used to develop cost estimates

Figure 7-2
Recommended Long-Term Improvement at Interchange 19





MASS HIGHWAY

Connecticut River Crossing Transportation Study

Figure 7-3
Route 9 Widening

(Sheet 1 of 1)

Source: MassGIS. Orthophoto Date, June 15, 1997

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Source:\\Mawatr\GIS\08036\Apr-Mxd\ct_river_crossing_4.apr

7.4 Implementation of Recommended Improvements

The implementation of transportation improvements can be a complex and sometimes lengthy process involving local, state, and federal agency approvals, depending on the scope of the project. More importantly, public support for the project is critical and can significantly alter the implementation process and schedule. Generally, transportation infrastructure projects (not including transit projects) are approved, funded, and constructed through the following process:

1. The local community where the project is located must make a written request for assistance to the MassHighway District Director (the study area falls under the jurisdiction of MassHighway District 2). The request should explain why improvements are needed, describe the proposed improvements, and indicate the level of local support for the project.

2. The District office will review the request and possibly require a Project Justification Report (PJR). It is the responsibility of the community to prepare the PJR, if requested (MassHighway may provide support toward the PJR development).

3. The community should meet with the District office and the regional planning agency, in this case the Pioneer Valley Planning Commission (PVPC) or the Franklin Regional Council of Governments (FRCOG), to discuss the potential priority of the proposed project and plan the remaining steps required to complete the process (possibly including holding a Public Informational Meeting to determine the degree of community support or opposition).

4. If the evaluation of the PJR is favorable and there is local support for the project and support from the regional planning agency, the district office will submit a favorable request to MassHighway's Project Review Committee (PRC). The PRC will then determine whether the proposed project is eligible for federal and state highway funding, and MassHighway will notify the community of the results (funding sources are described in more detail below).

5. Once the proposed project is approved by the PRC, the community should request that the regional planning agency (PVPC or FRCOG) place the project in the region's Transportation Improvement Program (TIP). Funding sources for the project are generally allocated once the project is placed on the TIP.

6. MassHighway will further evaluate the project and refine the scope of the project.

7. If necessary, state and federal environmental permitting documents must be prepared for the project. For State approvals, an Environmental Notification Form (ENF) is filed with the Massachusetts Environmental Policy Act (MEPA) office that describes the project and likely impacts. MEPA will issue a determination of whether the project requires an Environmental Impact Report (EIR). If the project is federally funded, it must comply with the National Environmental Policy Act (NEPA). Depending upon the nature of the project. NEPA documentation could consist of a Categorical Exclusion (CE), an Environmental Assessment (EA), or an Environmental Impact Statement (EIS).

8. Once the project is on the TIP and funding is allocated, the design phase of the project begins and construction documents (plans and specifications) are prepared. This effort can be funded by the community or by MassHighway and involves the submittal of 25 percent, 75 percent, or 100 percent design plans with specifications.

9. Once the project is designed, MassHighway advertises the project, reviews the bids that are received, and awards the project. Once the project is awarded to a contractor, a notice to proceed is issued for construction.

There are several sources of funding for transportation projects. It should be noted that many other projects compete for the same money; therefore, the priority of the project will determine if it is assigned to a funding category and programmed in the TIP. The funding categories include:

- National Highway System (NHS) – Funds for projects on all National Highway System roadways. NHS roadways include Interstate routes and a large percentage of urban and rural arterials. The funding split for this program is 80 percent federal funds, 20 percent state funds.
- Non–Federal Aid (NFA) – Funds for construction, reconstruction, and improvement projects on roads and bridges in urban and rural areas at the discretion of the state. The state share is 100 percent of the project costs.
- State Aid Roadways – Funds for construction, reconstruction, and improvement projects on town, city, and county roads, except Interstate or state-owned highways. The state share is 100 percent for projects on State Aid Roadways that are arterials or collector roadways. On other State aid roadways, the state share is 75 percent and the local share is 25 percent.
- Surface Transportation Program (STP) – Funds for projects chosen by states and localities on any roads that are not functionally classified as local or as rural minor collectors. These roads are referred to as Federal-aid roads. The

funding split for this program is 80 percent federal funds, 20 percent state funds.

- Congestion Mitigation/Air Quality (CMAQ) – Funds for projects in the Clean Air Act non-attainment areas for ozone and carbon monoxide. The funding split for this program is 80 percent federal funds, 20 percent state funds.
- Highway Bridge Replacement/Rehabilitation – Funds the replacement or repair of bridges based on structural adequacy and safety and serviceability. The funding split for this program is 80 percent federal funds, 20 percent state funds.

APPENDIX

- Study Advisory Group Membership
- Study Advisory Group Meeting Notes
- Public Informational Meeting Comments Received
- Response to Technical Comments

Study Advisory Group Membership

STUDY ADVISORY GOUP MEMBERSHIP

Name	Affiliation
Mr. Alan Blair	Western Massachusetts Economic Development Council
Mr. Timothy Brennan	Pioneer Valley Planning Commission
Mr. Ethan Britland	MassHighway Bureau of Transportation Planning and Development
Mr. Glenn Clark	Town of Hadley
Ms. Robin Crosbie	Town of Hadley
Ms. Linda Dunlavy	Franklin Regional Council of Governments
Mr. Stanley Gee	Federal Highway Administration
Mr. Alfred Griggs	A.L. Griggs Industries, Inc.
Ms. Marie Hess	Five Colleges, Inc.
Honorable Mayor Mary Clare Higgins	City of Northampton
Mr. Albert Stegemann	MassHighway District 2
Mr. Robie Hubley	
Mr. Alan Jacque	Hadley Board of Selectmen
Honorable Representative Peter Kocot	State Representative
Honorable Senator Michael Knapik	State Senator
Ms. Kerry Kuhlman	Western Massachusetts Electric
Honorable Representative Stephen Kulik	State Representative
Ms. Meryl Mandell	MassHighway District 2
Mr. Tom Miner	Connecticut River Watershed Council
Ms Maureen Mullaney	Franklin Regional Council of Governments
Mr. Bob Mitchell	Amherst Planning Department
Honorable Senator Stanley Rosenberg	State Senator
Honorable Representative John Scibak	State Senator
Mr. Gary Shepard	Pioneer Valley Transit Authority
Ms. Paula Simmons	MassHighway District 2
Mr. Jonathan Z. Souweine	Lesser, Newman, Souweine & Nasser, LLP
Ms. Judith Steinkamp	University of Massachusetts Amherst
Honorable Representative Ellen Story	State Representative
Ms. Diana Szynal	Town of Hatfield
Honorable Mayor Michael A. Tautznik	City of Easthampton
Dr. Chancellor John Lombardi	University of Massachusetts Amherst

Study Advisory Group Meeting Notes

Transportation
Land Development
Environmental
Services

VHB *Vanasse Hangen Brustlin, Inc.*

101 Walnut Street
Post Office Box 9151
Watertown, MA 02471-9151
Telephone (617) 924-1770
Fax (617) 924-2286

Meeting Notes

Attendees:	See attached list	Date/Time:	14 May 2002 4:00 PM
		Project No.:	MHD: 32077 VHB: 08036
Place:	MHD Distrct 2	Re:	CT River Crossing Transportation Study - Study Advisory Group Meeting #1
		Notes taken by:	Joe Wanat

AGENDA

I. Welcome and Introductions

II. Scope
- **Project Purpose**
- **Study Area Extent**
- **Evaluation Criteria**
- **Role of Study Advisory Committee**

III. Project Status
- **Origin Destination Surveys**
- **Traffic Data Collection**
- **Base Mapping**
- **Model Calibration**

IV. Schedule

V. Other Business

VI. Next Meeting

I. Welcome and Introductions

John Hoey (MassHighway District 2) began the meeting by noting the strong reliance on the bridge crossings and the need to look at improvements that help east-west travel across the river. John mentioned that the Sunderland Bridge was closed for a portion of the day because of a suspicious package, forcing more traffic down to the Hadley/Route 9 bridge.

Luisa Paiewonsky (MassHighway Planning) proceeded by noting that there has been significant progress since the last meeting and that a consultant, VHB, had been selected to assist MassHighway with this project. Luisa noted that contract negotiations with VHB have occurred over the past few months and a scope of services was negotiated and finalized in late March. Luisa reiterated MassHighways commitment to the project and suggested that everyone introduce themselves because there were many new faces to the group. Luisa introduced Ethan Britland as the new project manager for the study for MassHighway Planning.

Ethan Britland (MassHighway Planning) noted that VHB was the consultant selected and that work has already begun. Ethan introduced Joe Wanat (VHB) as the project manager for the consultant. Ethan provided extra copies of the Scope of Services for those who did not receive them.

II. Scope

Joe Wanat (VHB) proceeded to provide an overview of the scope of services for the project and provided the group with a handout of the purpose, evaluation criteria, study area, and role of the Study Advisory Group. After overviewing the purpose, evaluation criteria, study area, and role of the Study Advisory Committee, the following comments were voiced:

- **Project Purpose**

  There was a long discussion about the wording of the project purpose. Robie Hubley (Mass Audubon Society) noted that the purpose should include minimizing cost and minimizing disruption of the landscape. Luisa noted that the least costly alternative is not always the one that addresses long-term needs of the area and that measures such as cost effectiveness are included in the proposed criteria.

  Jonathan Souweine (Lesser, Newman, Souweine & Nasser) stated that the study should look at the effect of altering the UMASS class schedules on the traffic in the area and how the signals on Route 9 can be better coordinated. Joe Wanat noted that this idea of "level scheduling" and signal coordination are considered transportation systems management (TSM) solutions that will be considered as part of the study.

  It was agreed that the project purpose should not include evaluation criteria. The mention of "existing traffic and safety issues" should be removed from the project purpose.

- **Evaluation Criteria**

  Paul Shuldiner (UMASS) noted that the study should not be focused on existing traffic flows that are limited by the existing constraints. Paul mentioned that developing a model for future conditions will be important. Joe Wanat noted that the study will project traffic using a travel demand model for the area developed by the PVPC and FRCOG. Robin Crosbie (Town of Hadley) reiterated that preservation of community is very important.

  The evaluation criteria should be amended to include impacts to river/water quality, habitat/species, community character, endangered species, and consideration of telecommuting options.

- **Role of the Study Advisory Group**

  Concern was raised about whether the Study Advisory Group was able to vote and steer the projects recommendations through consensus (i.e. sign-off) and whether the Study Advisory Group should organize. The concern stems from the desire to make the Study Advisory Group's recommendations binding for the final study recommendations. Tim Brennan (PVPC) mentioned that there are other processes in place such as the Statewide Transportation Improvement Plan (TIP) that identify future projects. Mayor Michael Tautznik (Mayor of Easthampton) noted that an advisory group such as this is a positive aspect of the project. Paul Shuldiner (UMASS) reiterated that the group should take advantage of the opportunity to help guide this important project.

  Luisa Paiewonsky noted that MassHighway values the input and feedback of the Study Advisory Group and that the group will help steer the project as an advisory body, providing input throughout the study. Luisa noted that the process of interacting with an advisory group has worked very well on other projects and has helped make the recommendations projects come to fruition because of the local support gained through the advisory group outreach process.

- **Study Area**

  Jonathan Souweine and other attendees noted that the study area should include all five colleges in the area, and not just UMASS. The study area was extended to include the 5-colleges (UMASS, Amherst, Hampshire, Mount Holyoke, and Smith). At the request of Mayor Michael Tautznik (City of Easthampton), the study area was extended to include the intersection of Route 10/Route 141 in Easthampton.

III. Project Status

- **Origin Destination Surveys**

Joe Wanat proceeded to describe the origin-destinations surveys that were conducted in Sunderland and Hadley. Joe noted that about 15,000 surveys were handed out and almost 5,000 surveys were returned. Joe noted that the survey was handed out to several bicyclists in Hadley. Extra survey forms were distributed to the group. Several attendees noted that they received surveys. Joe mentioned that MassHighway was conducting traffic counts at the survey stations where tubes were placed across the roadway. The results of the survey will be discussed at the next meeting.

- **Traffic Data Collection**

Joe Wanat described that traffic data were collected at key intersections throughout the study area and that the counts were conducted while school was in session to account for student and teacher commute trips. VHB is also collecting travel time data on key roadway links throughout the study area during peak and off-peak times.

- **Base Mapping**

The base mapping for environmental constraints through the study area has begun and will be presented at the next meeting. The base mapping uses GIS data. VHB will also assemble an aerial map of the study area that will be used at the next meeting.

- **Model Calibration**

VHB is currently merging the FRCOG and the PVPC regional travel demand models. This will involve some model calibration. A question was asked about the consistency of the modeling with PVPC's efforts. Joe Wanat noted that PVPC provided their model to VHB. A question was asked about what software the model used. Maureen Mullaney (FRCOG) noted that it was a TransCAD model.

IV. Schedule

Joe Wanat proceeded by giving an overview of the project schedule. The project consists of 6 tasks (Project Initiation/Outreach; Existing Conditions; Alternatives Development; Alternatives Analysis; Recommendations; and Final Report). Project completion is expected next summer (July 2003). At the request of one of the attendees, a Study Advisory Group meeting was added to the schedule that would coincide with the end of Task 3 (Development of Improvement Options). The public meeting schedules for the summer was postponed to after Labor Day (late September) to accommodate summer vacations.

IV. Other Business

None

IV. Next Meeting

The next Study Advisory Group meeting is tentatively scheduled for the early August timeframe. Ethan Britland asked that the group provide summer vacation schedules to him. Ethan also mentioned that notice for the next meeting will contain relevant materials to be discussed.

The meeting was adjourned at 5:30 PM.

Meeting Attendees:

Tim Brennan, PVPC
Ethan Britland, MassHighway Planning
Robin Crosbie, Town of Hadley
Rick Marquis , FHWA
John Hoey, MassHighway District 2
Robie Hubley, Massachusetts Audubon Society
Alan Jacque, Hadley Board of Selectmen
Peter Miller, Designee for Senator Michael Knapik
Regina Curtis, Designee for Representative Stephen Kulik
Tom Miner, Connecticut River Watershed Council
Maureen Mullaney, FRCOG
Luisa Paiewonsky, MassHighway Planning
Mary Jane Bacon, Designee for Senator Stanley Rosenberg
Jonathan Souweine, Lesser, Newman, Souweine & Nasser, LLP
Judith Steinkamp, University of Massachusetts
Michael Tautznik, Mayor of Easthampton
Joe Wanat, VHB
Paul Shuldiner, University of Massachusetts
Joe Yablonski, MassHighway District 2
Keith Wilson, FRCOG
Ruth Bonsignore, VHB
Christine Conron, VHB

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Meeting Notes

Attendees: See attached list

Date/Time: 12 September 2002 4:00 PM

Project No.: MHD: 32077
VHB: 08036

Place: MHD Distrct 2

Re: CT River Crossing Transportation Study - Study Advisory Group Meeting #2

Notes taken by: J. Wanat / C. Conron

CONNECTICUT RIVER CROSSING TRANSPORTATION STUDY
STUDY ADVISORY GROUP MEETING

THURSDAY, SEPTEMBER 12, 2002

4:00 PM – 6:00 PM

MassHighway District 2 Office
811 North King Street
Northampton, MA 01060

AGENDA

I. **Old Business**
  - **Comments on the Minutes of 5/14/02 Meeting**
  - **Other Advisory Group Comments**

II. **Presentation of Existing Conditions**
  - **Chapter 1 - Introduction**
  - **Chapter 2 - Transportation**
  - **Chapter 3 - Environmental**

III. **Comments on Existing Conditions**

IV. **Schedule Next Meeting**
  - **Mid October**

V. **Other Business**

I. Old Business

Ethan Britland (MassHighway Planning) began the meeting by asking the attendees to introduce themselves. Ethan asked the group if there were any comments on the minutes from the previous meeting. No comments were voiced.

II. Presentation of Existing Conditions

Ethan proceeded to provide an overview of Chapter 1 of the existing conditions document. Ethan reviewed the study purpose, evaluation criteria, study process, schedule, and final report organization. Ethan noted that neighborhood and business dislocations were added to the list of evaluation criteria. There were no comments from the Study Advisory Group on Chapter 1.

Joe Wanat (VHB) provided an overview of Chapters 2 and 3 of the existing conditions document. Chapter 2 documented Existing Transportation Conditions and Chapter 3 documented Existing Environmental Conditions. Joe summarized the demographic data, traffic volume data, travel times, safety assessment, level of service assessment, origin-destination survey, and transit/bicycle sections comprising Chapter 2. Joe then provided a brief summary of Chapter 3, focusing on the process of identifying environmental constraints and explaining the constraint graphics provided in Chapter 3. Joe noted that this study is the first step in a process that would lead into more detailed environmental impact documentation.

The group provided many comments during and after the presentation.

III. Comments on Existing Conditions

The following comments were voiced by the Study Advisory Group:

Comments on Chapter 1:

- Provide a section in Chapter 1 that documents the history of problems in the study area and other transportation studies.
- Provide an executive summary that highlights the key points from the chapter.
- Note that any proposal for a new bridge must show logical connections to the existing highways in the study area, and not just a new crossing location.
- Pages 2 and 3, replace “affects” with “effects”.

Comments on Chapter 2:

- Add a section in Chapter 2 that documents the existing intelligent transportation systems (ITS) and travel demand management/transportation systems management (TSM/TDM) strategies in the study area and the effectiveness of these efforts.
- Provide an aerial-based graphic showing the I-91/Damon Road/Route 9 interchange in Northampton since this location was identified as one of the key problems in the study area.

- Replace the time-distance charts in Section 2.3 (Pages 15-19) with one chart that compares the average travel times for morning peak, evening peak, and off-peak times.
- Page 8, Smith College is in Northampton, not Holyoke.
- On Figure 2-5 (Page 13), show the traffic demands by direction, eastbound vs. westbound, for each bridge.
- Table 2-2 (Page 8), only show the employment data for employers within the study area.
- Add a table to Section 2.1 that summarizes the student population for the colleges in the study area.
- Figure 2-2 (Page 10), add traffic volumes from the 1992 Route 9 Corridor Study.
- Table 2-13 (Page 50), verify the estimated 4,700 eastbound trips to Hadley from the origin-destination survey.
- Add a discussion to Section 2.5 that discusses the extent of queues on Route 9 westbound approaching the Coolidge Bridge.
- The document seems to indicate several localized problems and an acute problem on both sides of the Coolidge Bridge. This needs to be made more evident, possibly by making concise statements in an executive summary.
- Existing conditions should also reflect conditions without construction impacts from the Coolidge Bridge, so that the final document does not become outdated once the construction activity ends.
- Emphasize that the alternatives analysis will be based on the 2025 forecast.
- Use the OD data on the Sunderland Bridge to quantify how many people are using the bridge to avoid Route 9 construction traffic. Possibly add a statement to Section 2.6.4
- Page 56, remove mention of the Five College Bikeway, as it is redundant and part of the Norwottuck Rail Trail system.
- The alternatives analysis must consider ITS as a way of improving mobility through the study area.

Comments on Chapter 3:

- Add the Conte Refuge to the environmental constraint graphics or at least provide a discussion of this area in the chapter.

IV. Schedule Next Meeting

After a brief discussion of timing and availability, the next Study Advisory Group meeting was scheduled for **October 17th, 2002 at 3:00 PM at MassHighway District 2.** The time of the meeting was moved to 3:00 PM to better accommodate the group. The group requested that any material discussed at the meeting be mailed about 2 weeks in advance for adequate review time.

V. Other Business

None

The meeting was adjourned at 5:45 PM.

Meeting Attendees:

Mary Jane Bacon, Designee for Senator Stanley Rosenberg
John Bechard, VHB
Tim Brennan, PVPC
Ethan Britland, MassHighway Planning
Judith Cameron, Hampshire Gazette
Glen Clark, Hadley Selectman
Christine Conron, VHB
Robin Crosbie, Town of Hadley
Regina Curtis, Designee for Representative Stephen Kulik
Linda Dunlavy, FRCOG
Alfred Griggs, AL Griggs Industries
Bruce Hangs, Strategic Banking Group
Diana Higgins, Town of Hatfield
Alan Jacque, Hadley Board of Selectmen
Designee for Peter Kocot, State Representative
Tom Miner, Connecticut River Watershed Council
Maureen Mullaney, FRCOG
Paul Shuldiner, University of Massachusetts
Jonathan Souweine, Lesser, Newman, Souweine & Nasser, LLP
Jean Stabell, Five Colleges, Inc.
Judith Steinkamp, University of Massachusetts
Michael Tautznik, Mayor of Easthampton
Joe Wanat, VHB
Keith Wilson, FRCOG
Joe Yablonski, MassHighway District 2

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Meeting Notes

Attendees:	See attached list	Date/Time:	17 October 2002 3:00 PM
		Project No.:	MHD: 32077 VHB: 08036
Place:	MHD Distrct 2	Re:	CT River Crossing Transportation Study - Study Advisory Group Meeting #3
		Notes taken by:	J. Wanat / R. Bonsignore

CONNECTICUT RIVER CROSSING TRANSPORTATION STUDY
STUDY ADVISORY GROUP MEETING

THURSDAY, OCTOBER 17, 2002

3:00 PM – 4:30 PM

MassHighway District 2 Office
811 North King Street
Northampton, MA 01060

AGENDA

I. Old Business
- **Comments on the Minutes of 9/14/02 Meeting**
- **Other Advisory Group Comments on the draft Existing Conditions report**

II. Presentation of Future 2025 Transportation Conditions

III. Comments on Future 2025 Transportation Conditions

IV. Schedule Next Meeting

V. Other Business

I. Old Business

Ethan Britland (MassHighway Planning) began the meeting by asking the attendees if there were any comments on the minutes from the previous meeting or any other comments on Chapters 1,2, or 3. No comments were voiced.

II. Presentation of Future 2025 Transportation Conditions

Joe Wanat (VHB) provided an overview of Chapter 4 which included the method of forecast and the resulting operations and volumes at the key intersections and bridges. Daily traffic volumes, vehicle miles traveled (VMT) and vehicle hours traveled (VHT) were discussed in detail. The demographic inputs to the model, households and employment, were presented for each community in the study area and discussed at length. The study advisory group provided many comments during and after the presentation regarding the regional model and the employment and household model inputs.

III. Comments on Future 2025 Transportation Conditions

The following comments were voiced by the Study Advisory Group:

- The model inputs for households and employments should be reviewed and checked. Many of the communities show very high employment growth (e.g. Northampton) and many show very high growth in households (e.g. Amherst).
- The model forecast should be compared to Department of Employment and Training (DET) data and the 1990 and 2000 Census numbers as a sanity check on how well the model is calibrated. The MISER data used by the model is outdated and may be the source of the problems.
- Gather historic AADT data for the key roadways that show trends over a longer span of time than just the 1990's.
- The model origin-destination patterns should be checked with the postcard origin-destination survey to make sure the model is allocating trips appropriately.
- The chapter should provide more detail on how the model works and should include the household and employment inputs in a table.
- Provide mode detail on level-of-service criteria.
- There are two key intersections that have been omitted in the study - they are the intersection of Route 116/Bay Road and the intersection of Damon Road and Industrial Drive. VHB will research available traffic volumes at these locations and include them in the analysis if possible.
- The intersection of Route 116 and Route 47 is on the latest TIP and the deficiencies may be addressed already.
- Look into the Concord Rotary study to investigate the potential for rotaries/roundabouts.
- Look carefully at the model inputs for Belchertown, as it is growing rapidly.

- Look at transit alternatives based on desire lines from the OD survey.
- Consider ITS for the discussion of alternatives. Expand the list of potential alternatives to include ITS projects. The alternatives should not just focus on highway capacity.
- Consider induced demand when evaluating the alternatives.

IV. Schedule Next Meeting

After a brief discussion of timing and availability, the next Study Advisory Group meeting was scheduled for November 19 at 3:00 PM at MassHighway District 2.

[[The meeting date has been postponed to December 10th, 2002 at 3:00 PM so that VHB can conduct the model calibration and outreach effort]].

V. Other Business

None

The meeting was adjourned at 4:20 PM.

Meeting Attendees:

Ruth Bonsignore, VHB
Tim Brennan, PVPC
Ethan Britland, MHD
Judith Cameron, Hampshire Gazette
Glenn Clark, Town of Hadley
Robin Crosby, Town of Hadley
Alexandra Dawson
Nancy Flavin, State Rep.
Alfred Griggs, AL Griggs
Mayor Mary Clare Higgins, Northampton
Alan Jacque, Town of Hadley
Regina Curtis, Designee for Rep. Stephen Curtis
Maureen Mullaney, FRCOG
Mary Jane Bacon, Designee for Sen. Rosenberg
Paul Shuldiner, UMASS
Judy Steinkamp, UMASS
Rob Stinson
Joe Wanat, VHB
Keith Wilson, FRGOC

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Meeting Notes

Attendees: See attached list

Date/Time: 10 December 2002 3:00 PM

Project No.: MHD: 32077
VHB: 08036

Place: MHD Distrct 2

Re: CT River Crossing Transportation Study - Study Advisory Group Meeting #4

Notes taken by: J. Wanat / R. Bonsignore

CONNECTICUT RIVER CROSSING TRANSPORTATION STUDY STUDY ADVISORY GROUP MEETING

TUESDAY, DECEMBER 10, 2002

3:00 PM – 5:00 PM

MassHighway District 2 Office
811 North King Street
Northampton, MA 01060

AGENDA

I. **Approval of Minutes**

II. **Review the Public Outreach Effort**

III. **Review Model Inputs and Changes**

IV. **Schedule Next Meeting**

I. Approval of Minutes

Ethan Britland (MassHighway Planning) began the meeting by asking the attendees if there were any comments on the minutes from the October 17, 2002 meeting. No comments were voiced.

II. Review of the Public Outreach Effort

Joe Wanat (VHB) provided an overview of the public outreach effort that was undertaken to address the groups concerns regarding the regional model's household and employment growth estimates. Joe explained that in addition to reviewing and changing the model, VHB has addressed other comments such as adding two intersections (Route 116/Bay Road and Damon Road/Industrial Drive), looking at the models trip distribution assumptions at the study area bridges, and reviewing AADT from before 1990 for comparative purposes.

The two intersections that were added are unsignalized and both have operational problems (LOS E/F operations). The future analysis and alternatives evaluation will include these locations in the assessment. The AADT research indicated that from the 1960's to present, traffic in the study area has increased by about 3 percent per year. From 1990 on, the traffic demand growth has dampened to about 2.5 percent per year.

The trip distribution in the model was compared to the origin-destination surveys conducted in April 2002 to verify how well the model is calibrated. This comparison showed small differences between the survey and the model. Because the survey was taken during the Coolidge Bridge reconstruction, there was some traffic bypassing the Coolidge Bridge during the survey. These bypass trips were not reflected in the model. Overall, the model closely resembles the trip patterns recorded during the origin-destination survey.

The remainder of the meeting focused on the model input changes, specifically the household and employment growth assumptions to the year 2025.

III. Review Model Inputs and Changes

For the study area, employment from 1984 to 2002 increased by an average of 0.57 percent per year based on DET data. The unadjusted model reflected an increase of 1.02 percent per year for employment. For household growth, the census trend in the study area was 0.62 percent per year and the model forecast was 0.56 percent per year. Based on outreach with the study area communities, a review of the 418 Build-out analyses and local growth plans, and the feedback that was received, the following model changes were made:

Municipality	2025 Household Forecast		2025 Employment Forecast		Proposed Change
	Unadjusted	Adjusted	Unadjusted	Adjusted	
Amherst	16,260	13,000	17,890	16,550	Decrease household growth; decrease employment growth
Easthampton	6,220	7,840	5,640	No change	Increase household growth
Hadley	1,670	2,280	5,440	No change	Increase household growth
Northampton	12,610	No change	25,030	19,540	Decrease employment growth
Belchertown	5,670	6,920	2,250	2,550	Increase household growth; increase employment growth

NET CHANGE	**+ 220**	**- 6,530**

In general, the group agreed that the changes were appropriate and expressed appreciation for the follow-up. Joe mentioned that there was one more community, Easthampton, that may need to be looked at. Over the next several weeks, VHB will solicit any additional feedback and make the changes and reanalyze 2025 conditions. This will involve regenerating trip productions and attractions using the adjusted inputs, distributing the regenerated trips to the OD pairs, and assigning new vehicle trips to the network and reanalyzing the baseline condition.

IV. Schedule Next Meeting

The next SAG meeting was not scheduled to ensure there was enough time to reply to the proposed model changes and to make further adjustments.

The meeting was adjourned at 4:30 PM.

Meeting Attendees:

Mary Jane Bacon, Designee for Sen. Rosenberg
Ruth Bonsignore, VHB
Ethan Britland, MHD
Judith Cameron, Hampshire Gazette
Glenn Clark, Town of Hadley
Robin Crosby, Town of Hadley
Ken Delude, Western Massachusetts Economic Development Council
Mayor Mary Clare Higgins, Northampton
Robie Hubley, Massachusetts Audubon Society
Alan Jacque, Town of Hadley
Tom Miner, Connecticut River Watershed Council
Melissa Paciulli, PVPC
Paul Shuldiner, UMASS
Jonathan Souweine, Lesser, Newman, Souweine & Nasser, LLP
Judy Steinkamp, UMASS
Mayor Michael Tautznik, Easthampton
Joe Wanat, VHB
Keith Wilson, FRCOG
Joe Yablonski, MHD

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Meeting Notes

Attendees: See attached

Date/Time: April 1, 2003 3:00-5:00 PM

Project No.: 08036

Place: MassHighway District 2

Re: CT River Study Advisory Group Meeting #5

Notes taken by: LMC/JTW

CONNECTICUT RIVER CROSSING TRANSPORTATION STUDY STUDY ADVISORY GROUP MEETING

TUESDAY, APRIL 1, 2003

3:00 PM – 5:00 PM

MassHighway District 2 Office
811 North King Street
Northampton, MA 01060

AGENDA

- **I. Update on Project Status**
- **II. Break-out Groups for Input/Discussion of Alternatives**
- **III. Discussion of Future Public Outreach**
- **IV. Other Business**
  - **Outstanding issues/comments**
- **V. Schedule Next Meeting**

I. Update on Project Status

Ethan Britland (MassHighway Planning) opened the meeting by summarizing the project team's efforts over the past few months, focused mostly on adjusting the regional model given the feedback from the Advisory Group. Joe Wanat (VHB) proceeded to give a brief presentation outlining the adjustments made to the 2025 model and the revised level of service analysis. An errata sheet was distributed for the Revised Future Transportation Conditions Chapter. There was a brief discussion of the growth at the UMASS Campus and whether the model was accounting for this growth. It was decided to accept the adjusted model for the time being. Joe asked that the study group forward any additional comments to MassHighway.

The focus of the meeting was to break into working groups to discuss the current alternatives list and identify other reasonable alternatives. The list includes alternatives developed by VHB and developed through outreach meetings held with PVPC, PCTA, MHD, and FRCOG. The goal is to put ideas on the table for consideration and then meet again in May to discuss the preliminary alternatives and any other alternatives to be considered.

II. Break-out Groups for Input/Discussion of Alternatives

The following comments, suggestions, and ideas were voiced by the three groups:

Group 1:

- Improve traffic flow through Route 9/Damon Road/Interchange 19, possibly considering a roundabout or a better connection from the Bridge to I-91 NB/SB
- Prioritize construction of Norwottuck Rail Trail connections to downtown Northampton
- Investigate feasibility of a multi-modal bridge crossing
- Consider connecting possible auto/rail bridge to north/south passenger rail extension
- Implement additional Park and Ride lots in Sunderland/Deerfield/Whately area and in Florence
- There is a high crash location at Route 5/10 at Christian Lane that should be looked at
- Improved bicycle facilities and wider shoulders for bikes along Route 116 from Deerfield to Amherst
- Keep bicycle racks on buses throughout the year
- Consider Park and Ride location at Exit 21
- Develop on road bike facilities throughout Amherst
- Install better signage leading to Route 202 – perhaps sign exit 16 for Route 202
- Is extension of Hartford to Springfield transit to Northampton/Amherst possible? Could they use the Amtrak rail?

Group 2:

- New bridges are most likely not the solution for the future given the impacts and character of the landscape

- Consider a fully directional interchange at Exit 19/Route 9
- Consider a rotary/roundabout at Exit 19/Route 9
- Improvements that would allow Route 9 and Bay Road to operate more efficiently;
- Bay Road congestion may solve itself when Route 9 is widened
- The potential park and ride location on River Road may need to be looked at more closely (possibly consider another location)
- Consider studying a bridge crossing connecting Comins Road and Bradstreet Depot Road or connecting Interchange 21 to Route 9
- Consider one way pair along Bay Road and West Street
- Look at what it would take to make Route 9 a consistent 4-lanes roadway
- West Street and Route 9/Route 47 in Hadley are very sensitive areas, minimize any impacts there

Group 3:

- Investigate possible extension of rail north of Springfield
- Light Rail or bus rapid transit on Norwottuck Rail Trail
- Look at creating a town Green/Village Center at Route 116 and Bay Road, possibly with a roundabout
- Include a bike path overpass or underpass across Damon Road
- Make Cross Path Road a right-turn only onto Route 9 and consider restricting access to Aquavitae Road
- The environmental constraints at the Exit 18 bridge locations will be far too high
- School crossing issue at Route 9/Bridge Street signal
- Consider ITS corridor improvements along I-91
- Telecommute options
- Park and Ride at MassHighway Maintenance facility
- Check queue distance on Exit 24 northbound off-ramp for signal

III. Discussion of Future Public Outreach

Ruth Bonsignore (VHB) suggested that it is time to bring the study efforts to the public to overview existing conditions, future conditions, and alternatives considered. Ruth recommended holding the meeting at a neutral location, possibly a hotel in the Northampton area. The format would be a brief 30-minute presentation followed by public comment and an "open house". The study advisory group felt it would be better to go through an internal screening analysis first, before going to the public. The group wanted to meet again mid-May timeframe to discuss the preliminary screening of alternatives. The Advisory Group recommended that any public meeting be held during the fall once the preliminary screening has been completed.

IV. Other Business

None

V. Schedule Next Meeting

The next meeting was scheduled for Tuesday, May 13, 2003 at 3:00 pm- 5:00pm at the MassHighway District 2 office in Northampton. This meeting will be focused on the preliminary screening.

Attendees

Ruth Bonsignore, VHB
Tim Brennan, PVPC
Ethan Britland, MHD
Laura Castelli, VHB
Linda Dunlavy, FRCOG
Mary Clare Higgins, Mayor of Northampton
Robie Hubley
Alan Jacque, Hadley
Meryl Mandell, MHD
Tom Miner, CT River Watershed Council
Maureen Mullaney, FRCOG
Gary Roux, PVPC
Paul Shuldiner, UMASS
Jean Stabell, Five Colleges, Inc.
Judith Steinkamp, UMASS
Jonathan Tucker, Amherst Planning
Joe Wanat, VHB
Keith Wilson, FRCOG

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Meeting Notes

Attendees: See attached

Date/Time: May13, 2003 3:00-5:00 PM

Project No.: 08036

Place: MassHighway District 2

Re: CT River Study Advisory Group Meeting #6

Notes taken by: JTW

CONNECTICUT RIVER CROSSING TRANSPORTATION STUDY STUDY ADVISORY GROUP MEETING

TUESDAY, MAY 13, 2003

3:00 PM – 5:00 PM

MassHighway District 2 Office
811 North King Street
Northampton, MA 01060

AGENDA

- **I. Update on Project Status**
- **II. Presentation of Preliminary Screening Analysis and Findings**
- **III. Study Advisory Group Commentary**
- **IV. Other Business**
  - **Outstanding issues/comments**
- **V. Next Steps**

I. Update on Project Status

Ethan Britland (MassHighway Planning) opened the meeting by summarizing the project team's efforts over the past few months, focused mostly on the preliminary screening analysis and the development of alternatives. The Advisory Group should have received a preliminary screening memorandum via email and a set of graphics and summary table in the mail. Additional copies were handed out.

The focus of the meeting was to discuss the preliminary screening analysis memorandum that was sent to the group and seek Advisory Group comments.

II. Presentation of Preliminary Screening Analysis and Findings

Joe Wanat (VHB) presented the preliminary screening analysis and the recommendations. The alternatives identified were comprised of:

- **Transportation System Management (TSM) Actions** – new traffic signals, signal coordination, etc;
- **Infrastructure Improvements** – including major changes to existing roadways such as new ramps, roadway widening, and roundabouts/rotaries;
- **New River Crossings** – consideration of new bridge connections across the Connecticut River; and
- **Transportation Demand Management (TDM) Strategies** – transit improvements, car ferry service, consideration of Park and Ride Lots or projects involving ITS technology that are geared toward making the existing transportation system more efficient.

Another memorandum will focus on transportation demand management options. The final screening analysis will "package" the alternatives and compare them using the evaluations criteria developed for the study.

III. Study Advisory Group Commentary

The following recommendations and comments were made by the Advisory Group during the meeting for the concepts presented:

TSM Improvements	Proposed Recommendation	Study Advisory Group Feedback
Concept 1 - Route 116/River Road Improvements (Deerfield)	Retain for further study and evaluation	Agree
Concept 2 - Signalize I-91 Interchange 24 Off-ramp at Route 5/10 (Whately)	Retain for further study and evaluation	Agree
Concept 3 - Signalize Route 5/10 at Elm Street/Allen Road (Northampton)	Retain for further study and evaluation	Agree
Concept 4 - Signalize I-91 Interchange 19 on-ramp at Route 9 (Northampton)	Retain for further study and evaluation	Agree, provide detail how this helps Route 9
Concept 5 - Signalize I-91 Interchange 18 southbound ramps at Route 5/10 (Northampton)	Retain for further study and evaluation	Agree
Concept 6 - Signalize Damon Road at Industrial Road (Northampton)	Retain for further study and evaluation	Agree
Concept 7 - Signalize Route 5 at Route 202 (Holyoke)	Retain for further study and evaluation	Agree
Concept 8 - Signalize Route 116/Bay Road (Amherst)	Retain for further study and evaluation	Agree, modify concept based on Atkins Corner Plan by Dodson Assoc.

Infrastructure Improvements	Proposed Recommendation	Study Advisory Group Feedback
Concept 9 - Route 116/Bay Road Roundabout (Amherst)	Retain for further study and evaluation	Eliminate concept, not consistent with Atkins Corner Plan by Dodson Assoc.
Concept 10 - Route 116/47 Roundabout (South Hadley)	Retain for further study and evaluation	Eliminate concept, not consistent with planned improvements, impacts to common area are too high
Concept 11 - Interchange 19 Roundabout (Northampton)	Eliminate concept	Agree
Concept 12 - Interchange 19 Signal System/Ramp Improvements (Northampton)	Retain for further study and evaluation	Agree
Concept 13 - Interchange 19 Rotary (Northampton)	Eliminate concept	Agree
Concept 14 - Interchange 19 Ramps (Northampton)	Eliminate concept	Retain for further study and evaluation, eliminate SB off-ramp and shift NB off-ramp
Concept 15 - Interchange 19 SB Flyover Ramp (Northampton)	Retain for further study and evaluation	Agree, provide ramp profile to estimate level of impacts to Coolidge Bridge

Concept 16 - Interchange 19 NB/SB Flyover Ramp (Northampton)	Retain for further study and evaluation	Agree, provide ramp profile to estimate level of impacts to Coolidge Bridge
Concept 17 - Route 9 Widening (Hadley, Route 47 to North Maple Street)	Retain for further study and evaluation	Agree, pursue 3-lane section to reduce impacts
Concept 18 - Route 116 Improvements (Hadley, Amherst, Sunderland)	Retain for further study and evaluation, scope of concept will be reduced based on existing design and capacity of Route 116	Agree, possibly include formal bike lanes

New Bridge Locations	**Proposed Recommendation**	**Study Advisory Group Feedback**
Bridge Location 1	Eliminate concept	Agree
Bridge Location 2	Retain for further study and evaluation	Agree, investigate alignment shifts that lessen impacts to aquifer areas in Hadley, possibly shift alignment to Mount Warner Road or Huntington Road
Bridge Location 3	Retain for further study and evaluation	Agree, investigate alignment shifts that lessen impacts
Bridge Location 4	Eliminate concept	Agree

IV. Other Business

None

V. Schedule Next Meeting

MassHighway will contact the group to schedule the next meeting. This meeting will focus on the preliminary screening of TDM options and presentation of concept revisions based on input from the group. The group indicated a mid-July date with a preference to meet earlier in the day, around 10:00 AM.

Attendees

Mary Jane Bacon, Designee for Senator Rosenberg
Ruth Bonsignore, VHB
Tim Brennan, PVPC
Ethan Britland, MHD
Robin Crosby, Town of Hadley
Mike Dowd, Designee for Rep. Scibak
Dan Dulaski, UMASS, designee for Paul Shuldiner
Linda Dunlavy, FRCOG
Alan Jacque, Hadley
Meryl Mandell, MHD
Tom Miner, CT River Watershed Council

Bob Mitchell, Amherst Planning Dept.
Jonathan Souweine, Lesser, Newman, Souweine & Nasser, LLP
Gary Roux, PVPC
Jean Stabell, Five Colleges, Inc.
Judith Steinkamp, UMASS
Mayor Michael Tautznik, Mayor of Easthampton
Joe Wanat, VHB

Transportation
Land Development
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Services

Vanasse Hangen Brustlin, Inc.

101 Walnut Street
Post Office Box 9151
Watertown, MA 02471-9151
Telephone (617) 924-1770
Fax (617) 924-2286

Meeting Notes

Attendees:	See attached	Date/Time:	July 15, 2003 10:00 AM -12:00 PM
		Project No.:	08036
Place:	MassHighway District 2	Re:	CT River Study Advisory Group Meeting #7
		Notes taken by:	LMC

CONNECTICUT RIVER CROSSING TRANSPORTATION STUDY STUDY ADVISORY GROUP MEETING

TUESDAY, JULY 15, 2003

10:00 AM – 12:00 PM

MassHighway District 2 Office
811 North King Street
Northampton, MA 01060

AGENDA

I. Introductions

II. Update of Infrastructure Options Considered

III. Presentation of Transportation Demand Management (TDM) Memorandum

IV. Other Business
- **Outstanding issues/comments**

V. Next Steps
- **Schedule Next meeting**

I. Introductions

Ethan Britland (MassHighway Planning) opened the meeting by reintroducing the team and summarizing the project team's efforts over the past few months, focused mostly on the preliminary screening analysis and the development of Transportation Demand Management (TDM) alternatives. The Advisory Group should have received a preliminary screening memorandum via email. Additional copies were available if needed.

The focus of the meeting was to discuss the second preliminary screening analysis memorandum and seek Advisory Group comments.

II. Update of Infrastructure Options Considered

An overview of the alternatives reconsidered since the first screening memorandum was presented. The following alternatives have been modified or re-included in the set of alternatives to be carried forward:

- Concept 8/Concept 9 – Route 116 at Bay Road – Alternative 8 (traffic signal) has been modified and analyzed to show the preferred Atkins Corner Plan. Preliminary analyses show this alternative should operate at acceptable level of service under 2025 conditions, although it should be noted that the volumes presented as part of this study may differ from those presented in the Atkins Corner Study. Alternative 9 (roundabout) was eliminated from further review since it is not consistent with the Atkins Corner Plan.

- Concept 10 – Route 116/Route 47 Roundabout – This concept has been eliminated from further consideration, as it is not consistent with planned improvements at the intersection and would have substantial impacts to the common area.

- Concept 14 – Interchange 19 ramps – This concept has been modified to remove the southbound off-ramp to Route 9. The modified concept will be retained and analyzed as part of the final screening process.

- Concept 17 – Route 9 widening – This concept has been modified to analyze the impact of a 3-lane cross section.

- Concept 18 – Route 116 Improvements – This alternative has been modified to focus specifically on potential improvements to the intersection of Route 116 and Meadow Street (Route 63).

- Bridge Locations 2 and 3 – The roadways connecting both potential bridge alignments to the existing street network have been shifted away from the Hadley water supply.

- Other Options Considered – VHB also assessed the impacts of constructing an underpass connecting Route 9 to I-91 southbound. This underpass should not be further pursued due to insufficient spacing between Damon Road and the Coolidge Bridge abutment, and potential floodplain, soil, and water table issues.

III. Presentation of Transportation Demand Management (TDM) Memorandum

Ruth Bonsignore (VHB) presented the preliminary screening analysis of the TDM alternatives. The alternatives identified were comprised of:

- Park and Ride Locations
- ITS Deployment
- Transit Options
- Pedestrian and Bicycle Improvements
- Car Ferry Service

The final screening analysis will "package" TDM alternatives with infrastructure alternatives and compare them using the evaluation criteria developed for the study. The following tables summarize the comments provided by the study advisory group regarding the alternatives presented.

Park and Ride Locations:

Park and Ride Location	**Proposed Recommendation**	**Study Advisory Group Feedback**
Oxbow/Mt. Tom	Eliminate	Agreed.
Florence	Retain	Agreed. VHB will investigate potential locations.
South Deerfield, Mt Sugarloaf, or Exit 24	Retain	Some committee members felt that the facility should be in Sunderland Center and operated off of the existing Route 31 bus. VHB will investigate this option.
Enhance Existing Park and Ride in Northampton	Retain	Agree. Should increase visibility and education about existing park and ride lot at Sheldon Field. Damon Road lot may not officially be designated as park and ride. DEM has ownership and maintenance of lot. VHB to investigate.

ITS Deployment

The group felt that the ITS Deployment information in the memo was too heavily weighed towards the regional and highway based deployment. MassHighway felt that the terms are too specific and should be left more general in this study since their plan is evolving.

The PVTA felt that there should be more inclusion of the newly released PVTA ITS Deployment program. The PVPC will provide VHB with the Transit ITS Deployment Schedule and program for inclusion in the final report. Additionally, the report should be more inclusive of ITS expected along the Route 9 and Route 116 corridors and the effects the regional deployment program will have on them. VHB has agreed to meet with representatives from the UMass sector of the Regional Transportation Information Center (RTIC) and PVPC/PVTA to discuss study assumptions.

Generally, the group thought this section of the report should be more dynamic, including potential benefits of an ITS system, more management strategies (as opposed to technologies), and more examples of what good projects are. The group also felt that the study should recommend a bi-regional ITS committee be commenced to bring forward beneficial options. (The group conceded that none of this information exists and benefits are pure speculation at this point in time). Finally, the group felt that the final report must distinguish that the 2003 MassHighway Deployment Plan is not a guiding principle for the Connecticut River Crossing Transportation Study.

Transit Improvements:

Transit Improvement	**Proposed Recommendation**	**Study Advisory Group Feedback**
Route 9 Express Bus with signal preemption	Eliminate	The SAG asked VHB to investigate a hybrid BRT system along Route 9 (see below).
Route 9 Fixed Rail/BRT	Eliminate	Agreed, but combine with signal preemption to create a new hybrid BRT alternative. (Comment: leave the door open beyond the 25-year horizon to reestablish whether this alternative is viable.)
New Hybrid Concept	Refine	VHB will meet with PVTA/PVPC to establish appropriate system to analyze. Will likely include advanced communication system, improved facilities, queue bypass lanes, cleaner buses, more direct frequent service, and connections to park and ride lots.
Increased Service to Shopping Malls	Refine	Conclusions were that increased service is not needed; however VHB should look at the possibility of allowing buses to exit via the Bread and Circus driveway.
Increased north/south service	Refine	Agreed.
Holyoke to the Universities Connections	Eliminate	The PVTA felt the ridership exists to support this service, especially between UMass and the Holyoke Mall. VHB has agreed to meet with PVTA to see if there is further information available to support a service. If so, VHB will refine this alternative and carry it forward.
Extended Night Service	Eliminate	Agreed, but language in report should clarify that it does not relate to this study but is perhaps worthwhile by other means.
New Alternatives		VHB should consider electric trolley service running on the Norwottuck Rail Trail. Is there a way to share this service with rail trail users if it were a one-way system? What are impacts to trail?

Pedestrian and Bicycle Accommodations:

Pedestrian Bicycle Accommodation	**Proposed Recommendation**	**Study Advisory Group Feedback**
Route 9 and Route 47 Improvements	Retain	Agreed. VHB to develop concept
Increased Norwottuck maintenance	Eliminate	Agreed, but report should specify that this is for year-round maintenance. Overall maintenance is needed. Study should defer to DEM on this matter.
Norwottuck widening	Refine	According to a survey just completed by the PVPC, public perception is not to widen the rail trail. (PVPC will forward VHB a copy of this study.) Should be noted that DEM has ultimate decision on widening.
Route 9 on-road bike lanes	Eliminate	Agreed. (Note: VHB should use ridership numbers provided in the new UMass Bike Study. Judy will forward this study to VHB.)
Route 116 on-road bike lanes	Eliminate	Agreed.

Car Ferry Locations:

Car Ferry Location	**Proposed Recommendation**	**Study Advisory Group Feedback**
Location 1	Eliminate	Agreed. VHB should provide more information on how ridership numbers were developed and eliminate sentence about traffic reconnecting to Route 9. VHB should also look at the Glastonbury ferry for comparison purposes if this ferry is year round service
Location 2	Eliminate	Agreed; however, representative from Hatfield noted that location 2 is on the national register of historic places and should be reported as such. VHB should provide more information on how ridership numbers were developed and eliminate sentence about traffic reconnecting to Route 9.
Location 3	Eliminate	Agreed.

IV. Other Business

VHB will prepare two TDM packages for evaluation by the group (A bullet list of what these packages will encompass can be found below). Findings will be provided at the next SAG meeting.

VI. Next Steps

The next meeting is scheduled for Tuesday, September 23, 2003 at 10:00 AM

VII. Post Notes

VHB is currently modeling the overall study area effects of two "TDM packages" including:

TDM Package #1

- Park and Ride locations
    - Upgrade and consolidation of the existing facilities (Damon Road and Sheldon Field)
    - New facility in Florence
    - New facility in South Deerfield/Sunderland
- Increased north/south bus service with connection to Deerfield park and ride
- Regional Transportation Information Center (RTIC)
- Fixed route automatic vehicle location (AVL) deployment
- Advanced passenger information system

TDM Package #2

- All of the above, *plus*
- Enhanced BRT line from Damon Road park and ride to UMass/University Drive

Attendees

Mary Jane Bacon, Designee for Senator Rosenberg
Ruth Bonsignore, VHB
Tim Brennan, PVPC
Ethan Britland, MHD
Laura Castelli, VHB
Robin Crosby, Town of Hadley
Diana Szynal, Town of Hatfield
Regina Curtis, Designee for Rep. Kulik
Meryl Mandell, MHD
Maureen Mullaney, FRCOG
Keith Wilson, FRCOG
Bob Judge, Designee for Rep. Scibak
Jean Stabell, Five Colleges, Inc.
Paul Shuldiner, UMass
Gary Roux, PVPC
Judith Steinkamp, UMASS
Mayor Michael Tautznik, Mayor of Easthampton

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Fax (617) 924-2286

Meeting Notes

Attendees:	Ruth Bonsignore, VHB Laura Castelli, VHB Ethan Britland, MassHighway SAG (see attached)	Date/Time:	10/21/03 10:00 am - 12:00 pm
		Project No.:	08036
Place:	MHD District 2	Re:	CT River SAG 8
		Notes taken by:	Laura Castelli

CONNECTICUT RIVER CROSSING TRANSPORTATION STUDY
STUDY ADVISORY GROUP MEETING

TUESDAY, October 21, 2003

10:00 AM – 12:00 PM

MassHighway District 2 Office
811 North King Street
Northampton, MA 01060

AGENDA

I. Update on Project Status

II. Presentation of Supplemental Screening of Transportation Alternatives

- Supplemental Screening of TDM Alternatives
- Second Level Screening
- Status of Draft Recommended Improvement Plan

III. Study Advisory Group Commentary

IV. Other Business

- Outstanding issues/comments

V. Next Steps

I. Update on Project Status

Ethan Britland (MassHighway Planning) opened the meeting by reintroducing the team and summarizing the project team's efforts over the past few months, focused mostly on the secondary screening analysis, additional analysis requested by the SAG, and the draft recommended improvement plan. The Advisory Group should have received a secondary screening memorandum via email. Ethan asked for questions or comments on the SAG 7 meeting notes distributed with the memorandum. There were none. Finally, Ethan announced that District 2 has a new interim highway director who may be joining the SAG at some point during the meeting.

The focus of the meeting was to discuss the second secondary screening analysis memorandum and seek Advisory Group comments.

II. Presentation of Supplemental Screening of Transportation Alternatives

Ruth Bonsignore (VHB) gave an overview presentation summarizing the memorandum and process for the last few months. Ruth indicated that at the end of the meeting, the SAG would also be asked to give their input on the public process and a potential legislative briefing. She also mentioned that VHB's project manager, Joe Wanat, would be returning from active military duty at the end of the week.

III. Study Advisory Group Commentary

ITS

Ruth gave an overview of how ITS initiatives will be incorporated into the Final Transportation Study. Since the July meeting, fairly extensive information has been provided by the PVTA and UMass (RTIC & TMA/TDM Coordinators). This information will be presented in the final report.

SAG members wondered about the cost benefit of an ITS program and why a level of service analysis was not performed. Could it be or is it purely speculation? If so, study must acknowledge limited benefits of ITS and that these benefits cannot be justified and make the point crystal clear. Ruth agreed that the study should reflect that the TDM benefits are speculative and that outside of national literature, which suggest 10-15% reductions, there is no hard analysis. We have information on usage of existing system but no hard data on whether users divert or save time with advanced knowledge.

Sunderland P & R

Ruth noted that the ridership in Sunderland would be similar to Deerfield. By staying on the east side of the river, a "tripper" bus would be needed instead of a new bus/expanded route. However, there is no site for a Sunderland lot identified.

SAG members felt that Sheldon field is a big waste of money and that people are proving that they will not park and get on the bus. Some members felt if a lot is constructed it should remain on the Deerfield side of the river as originally suggested, perhaps at the DOT facility. Others felt that the lots would only be attractive to UMass employees and that these employees would park at the UMass outer lots anyway.

Ruth reiterated that VHB assumed a very small capture rate of the potential marked (1-2 percent) and that some would utilize a park and ride facility. She also noted the opportunity for a smaller shared use lot, such as a church.

VHB should indicate in the study that a facility would have to be heavily marketed to the UMass population since they are now the only riders that can ride the bus for free. There could be a huge disincentive with new bus fees.

Hybrid BRT

The PVTA/PVPC vision of original alternative service is viable. The cost would be between $6 and 8 million. One third to one quarter of the original cost of separate R-O-W. The alternative remains an unresolved recommendation since the merits of service are unclear if it means sacrificing other improvements so the BRT can be financed. The ridership service enhancement assumed is based on national statistics.

SAG members felt that if the public could count on the service they can plan ahead and would be likely to use it. If bus gets preferential treatment it should be supported. But what about people in Florence and other areas outside of the designated BRT section? For this service to work we need connections to park and ride and need to address how people outside the hybrid Section would use service. VHB should also provide a level of service designations and analysis to quantify benefit. Can VHB translate benefit to delay reduction?

Others felt that since this service is aimed at regular travelers of Route 9, and does not account for a reduction in travel related to ancillary uses and UMass, the study should be clear at what the target market is.

Car Ferries

VHB looked at the effects of providing a less efficient service. The results show significantly less ridership with the increased delay (55 percent). In addition year round service is problematic. VHB recommends not pursuing this alternative. SAG members agree.

Electric Trolley

The ridership and separate corridor facility benefits do not justify land use impacts to get same service (almost) as BRT hybrid. Trolley absolutely cannot use existing bridge. VHB recommended dismissing alternative but will put all information in final report.

Holyoke to the Universities bus service

Even considering the new ridership figures provided by the PVTA, only 60 passenger trips per day would be accommodated by this service. It does not meet study goals, as this translates to only a handful of trips during peak commuting periods.

TSM packages/recommend improvements

All TSM locations should become part of the final recommendations. Some will be listed as short term and some as medium term.

A SAG member noted a discrepancy in the TSM table at River Road. VHB will check analysis results and fix or explain discrepancy.

Route 116

Statistics do not appear to show physical geometric problem at Meadow Street, but split phasing and timing changes could reduce crashes at this location. VHB will look at the severity of accidents, but does not see a pattern of high personal injury in the available data. VHB will also conduct a turning movement count at Sunderland Road. However, from field observations it does not appear that the southbound left-turns meet the warrant criteria for a left-turn lane. These two intersections will be added to the TSM table presented in the final report.

At the field inspection, VHB noticed an empty brand new traffic signal cabinet. The representative from Amherst will look into whether the controller will be upgraded or just relocated to the new cabinet.

Exit 19 Interchange

Study should quantify the benefits to westbound Route 9 and Bridge. VHB should more clearly define the lengthening of the northbound off ramp and comment on the impacts to traffic flow this has on exit 18. Is there a need for physical improvements at both interchanges? VHB should also provide cost estimates for all recommendations in final improvement table.

Route 9 Access

The issue of Aqua Vitae Road, Old Bay Road, and Cross Path roads was discussed. VHB needs to review access driveway to the Marina and the proposed MassHighway plans. The potential could be to relocate access to Aqua Vitae Road and close the driveway Marina Drive instead. [VHB subsequently reviewed MassHighway plans which show full access at the Marina and right-in/right-out at Cross Path Road.]

VHB has considered a three-lane Route 9, which may solve congestion short-term, but will need to recommend a four to five lane cross-section (with more aggressive access management) along Route 9, unless Hadley considers downzoning the land along the corridor or land use management program. Hadley is proposing rezoning the land more densely. In lieu of Route 9, drivers may choose Bay Road and Rocky Hill Road as a route 9 bypass.

SAG members are concerned about recommending a roadway widening to the public as a way to avoid construction of another bridge. According to some SAG members, the current administration has indicated that future funding will be targeted toward communities that are willing to manage land use. The final report must state that funds would not be available forthwith to widen Route 9 to accommodate development.

IV. Other Business

VHB is concluding that there is no compelling reason to recommend an additional bridge. The analysis results show acceptable levels of service through 2025 with four lanes along Route 9. Of the unresolved recommendations, VHB feels the BRT and widening Route 9 to 4-lanes should be carried forward.

The SAG members feel VHB needs to be clearer in the explanation that the proposed improvements will be significant and sufficient, needs to show the public impacts of a new bridge beyond immediate river vicinity and drive home the fact that a new bridge means new roads are necessary. The final report must quantify disbenefits of not doing vs. benefits of doing in way citizen can understand.

Public Meeting:

VHB will go to the public meeting with "no bridge" recommendation, identifying all of the alternatives investigated and what the draft recommendations will be.

Logistically, the SAG feels the meeting should be very structured, with a presentation and one large question and answer session instead of an open house format. There were mixed opinions on whether one meeting was sufficient. Some ideas included one meeting in Hadley at the school on Route 9, providing an afternoon and evening meeting at the same location, or providing an afternoon and evening meeting at different locations. In either case, a legislative briefing should be held beforehand in Boston.

[It was subsequently decided that two public meetings will be held: one the afternoon in Halley and one in the evening in Northampton.]

Whether one or two meetings are held, there needs to be an extensive outreach program to indicate the meeting is for regional attendance Members of the SAG can and should be outreach modes, giving lead time to public and local access cable channels. MassHighway should also reach out to the local Chambers of Commerce. The group felt if a high turn out was desired, all that would have t be done was a press release stating the no bridge recommendation.

A target public meeting date was set for early December, either Monday 12/8 or Tuesday 12/9.

Attendees

Mary Jane Bacon, Designee for Senator Rosenberg
Ruth Bonsignore, VHB
Tim Brennan, PVPC
Ethan Britland, MHD
Laura Castelli, VHB
Robin Crosby, Town of Hadley
Regina Curtis, Designee for Rep. Kulik
Linda Dunlavy, FRCOG
Marie Hess, Five Colleges, Inc.
Bob Judge, Designee for Rep. Scibak
Meryl Mandell, MHD
Tom Miner, CT River Watershed Council
Bob Mitchell, Amherst Planning Dept.
Maureen Mullaney, FRCOG
Gary Roux, PVPC
Paul Shuldiner, UMass
Jonathan Souweine, Lesser, Newman, Souweine, & Nasser
Diana Szynal, Town of Hatfield
Mayor Michael Tautznik, Mayor of Easthampton
Keith Wilson, FRCOG

Public Informational Meetings

- **Comments Received**
- **Response to Technical Comments**

JOHN W. OLVER
1st District, Massachusetts

Committee:
APPROPRIATIONS

Subcommittees:
TRANSPORTATION AND TREASURY
Ranking Member
INTERIOR

ASSISTANT WHIP

Congress of the United States
House of Representatives
Washington, DC 20515–2101

Please respond to

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(413) 442–0946
(413) 443–2792 Fax

☐ 463 Main Street
Fitchburg, MA 01420
(978) 342–8722
(978) 343–8156 Fax

January 8, 2004

Roy Kimmel
PO Box 159
Leverett, MA 01054

Dear Mr. Kimmel:

Thank you for contacting my office regarding the widening of Route 9 in Hadley. I spoke with the District Director of Mass Highway and he informed me that the project is scheduled to go to bid in June or July, which means that construction will either start late this coming fall (2004) or in early spring 2005. If my office can be of further assistance please contact Kristin Wood in my Holyoke office, 413-532-7010.

Sincerely,

John W. Olver

John W. Olver
Member of Congress

JWO/kw

cc: Laura Castelli

PRINTED ON RECYCLED PAPER

Connecticut River Crossing Transportation Study
Public Information Meeting

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

Verbal Comment Received from State Rep. Scibak

> There has been significant increase in pedestrian activity on Route 9 with the new Regions Plaza and with the Shelter Workshop.

❖ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

(1) Get a public Address system when Addressing a large crowd. Very difficult to hear the Speaker. — A Must for all Future Presentations! Poor Planning on the Part of the State.

❖ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

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Watertown, MA 02471
Attn: Laura Castelli

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

- Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

Dec. 14, 2003

I would like to complement your Committee on providing a speaker who spoke clearly - easy to follow presentation so we all understood at the end of the meeting the steps and reasoning which led you (and us) to the final concept of solving the traffic problems over the Conn. River. I hope you can implement the strategy soon. Your plan to eliminate ~~et~~ the 3 crossings in Hatfield met with sighs of relief by the 30 or so Hatfield people who attended the meeting. Your reasons were all sound, and I for one was quite impressed that you took into account the fact that Historical District neighborhoods would be drastically changed with a major traffic route running through these districts. We, who have worked on listing these districts have long recognized the possibility. We wish more people from Hatfield were there to hear this presentation.

Thank you for a job well done.

Mary Lou Cutter, Chairman
Hatfield Historical Commissi

Mary Lou Cutter
131 Prospect St
Hatfield, MA 01038-9741

- Thank you for you ase submit your comments here tonight or mail them back to the following address December 15:

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

① Thank you for finally (I hope) putting to rest the idea of building another bridge

Interchange
② ~~[illegible]~~ 19 strategy looks key & promising ie → fully directional

I recommend a 5th lane on West St. as a left turn

Location #2 is my best ~~[illegible]~~

❖ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

- Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

YOUR ANSWER TO - making Damon Rd
was unsatisfactory. To eliminate congestion
at the bridge - why feed Traffic into iT
from Damon - rather Toy with idea of using
Industrial Drive + drawing some proposed
access to Rt. 9 further down Bridge ST.

- Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

As a resident of Sunderland near the Comins Road area and a long-time land use planner for Pioneer Valley Planning Commission, I strongly support the study recommendation for NO NEW BRIDGE. Any of the proposed new bridge locations would have severe negative impacts on neighborhood & rural character, prime farmlands and environmental features.

I support your proposed improvements at the Damon Road, Route 9 intersection to make it a 3-way intersection. However, I do believe the best long-term solution at this location is a fly-over to connect Damon Road eastbound traffic to Route 9 eastbound without a traffic light. This would eliminate the traffic light at Damon Road altogether – a key problem in the Route 9 traffic flow issue in my view.

Thanks for your good work,

Chris Curtis

❖ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

Thank you so much for this careful study of transportation in the Pioneer Valley.

It feels good being part of this community.

My comments:

I do not know if you are aware that the big problem (the bridge on rout 9) was resolve for a time when there were policemen directing the traffic and not the lights. The flow of traffic Amherst going to Northampton was very efficient. So means that a better design of lights in the bridge will make the flow of traffic more efficient, right away.

Also I would like to see the possibility of closing the left turn at the same light, coming from Northampton to Amherst. This will also improve the flow of traffic without affecting much the neighborhood (people will have to use more King Street to reach 91 north).

I do hope we can get a light at Bay Road with rout 116. It is a very dangerous intersection. If that is hard, how about to put some deep marks in the pavement that produce sounds and warns people of the dangerous intersection. They have it on rout 2 where the way becomes two-line road instead of the 4-line road.

Thank you again for your careful study.

Yours, Catalina Arrubla
3 Bristol Lane, Hadley
Phone: 413- 584 7951
e-mail: carrubla@acad.umass.edu

Renee Fall
57 Huntington Rd.
Hadley, MA 01035

December 15, 2003

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut St., P.O. Box 9151
Watertown, MA 02471
Attn: Laura Castelli

To Whom It May Concern:

I attended the public meeting in Hadley on December 9 and would like to comment on the study, its methods, and findings.

1. Lack of Public Input

I understand the Study Advisory Group met regularly and included representatives of agencies, institutions and government, who understandably came to the table with particular concerns and priorities. I question why the only other public input came at the very end of the process and why more public meetings were not held at earlier points in the study period, when the critical steps of goal-setting and assumptions took place. This would have afforded regular citizens opportunities to learn about the methods of the study, options considered, and to provide additional feedback that would likely have resulted in a more thorough consideration and fewer questions at the study's end.

2. Existing Conditions

Since the study took place when reconstruction of the Coolidge Bridge was underway, the existing conditions do not represent "normal" traffic flows. Already by the time of the survey, drivers were adjusting their travel times, as well as routes, to avoid peak back-ups on the bridge. I and most of the people I know avoid driving the bridge and Route 9 at peak hours if at all possible. This makes it hard to know what "peak" hours would be when bridge construction is not happening. I hope the final study will address this.

3. Projected Traffic

I hope the final study will make clear the basis for traffic projections; the presenters on December 9 did not. It is not clear, for example, if growth at UMass is accounted for (and if so, at what rate). It is also not clear if the proposed developments in Hadley (e.g., Home Depot mall and Lowe's) as well as very recent changes (Target and Trader Joes) are included in these projections. The response of Mr. Wanat seemed to indicate that at least the planned Home Depot and Lowe's are not, which would be a significant underestimation of traffic in the near future. Those of us who travel Route 9 regularly have experienced an increase in traffic since just this past October. And the new Home Depot and Lowe's developments' own traffic studies predict some 14,000 additional trips per day on their busiest days.

4. Public support for public transit

I hope the study will fully explore the potential of Bus Rapid Transit and other improved public transportation options. This seems most sensible, given the finding that most trips begin or end in Northampton/Amherst/Hadley. I also hope the study will address how to increase public support for and use of public transit. Considering the local culture (high level of concern for environment, many students and others with flexible schedules) good marketing and public relations could go far in changing behavior related to transportation. We need to reduce the number of single-occupancy vehicles across the Coolidge Bridge, and I hope the study will make more recommendations about ways to do this using public transit.

5. Incentives for Changing Transportation Behavior

I also hope the study will address how employers, municipalities, and local businesses and institutions might become partners in solving the transportation problems. For example, there are a handful of large employers in the area, and work-commute trips create the biggest traffic problems. Can the study address how changes in commuting behavior might impact the overall transportation system? What might employers, businesses, colleges, and universities consider (e.g., incentives for riding the bus or car pooling; car-pool match-making; bicycle-friendly workplaces; flexible schedules; telecommuting, and so on) to encourage change? The "hand-out" at the meeting mentions some of these strategies as a part of TSM, but the changes involving people and policies seem to receive much less attention than signal changes.

Thank you for the opportunity to comment on the presentation at the public meeting. Like many others, I believe building additional bridges is a "last resort" solution to our transportation problems. With technology, research, and knowledge at our disposal, we must find ways to get around in our communities without destroying the environment and local community habitats we value. The community will no doubt benefit from and build upon the work undertaken in this study for years to come.

Sincerely yours,

Renee Fall

Renee Fall

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

It must have been a foregone conclusion that after investing close to $30 million for the reconstruction of the Coolidge Bridge (contract awarded for $19 million but now a $28 million project according to press reports) that the State had no intentions of building a second bridge.

The $300,000 study by Vanasse Hangen Brustlin, Inc. was spent, in my opinion, simply to satisfy those who do not want another bridge built. I find it hard to believe that traffic on Rt. 9 between I-91 and the Amherst/U-Mass area will only increase by 1% per year by 2025. Rampant big box retail outlets, future Mass Venture Center growth and other growth in the Pioneer Valley (whether well planned or not) will simply over burden the badly planned Rt. 9 in Hadley in short order. Those who believe this will not be the case are in denial.

If people in a community are told "If the community doesn't want it, we're not going to build it" as stated by Ethan Britland of the State Highway Department, naturally there always will be those who would say "right, not in my back yard". If this was the scenario during the past half century, I doubt if the US Interstate Highway system would have been built. Locally, the Rt. 116 Amherst by-pass would not have been built.

So, Rt. 9 in Hadley will continue to be an increasingly congested, dangerous and polluted strip indefinitely. Widening the Coolidge Bridge and marginally better access onto I-91 at the south end of Damon Road will help somewhat, but only for the short term.

I did ask the question to Mr. Britland at the December 9 hearing when the widening of Rt. 9 from Coolidge Bridge to West Street would start and be completed. Unfortunately, I did not get an answer because someone in the front row started to talking to Mr. Britland after I ask my question. The Mass Highway web site provided no answer. Previous press reports indicated this work would start as soon as the bridge work was completed. Now I am not so sure. Any answers to my question?

Roy Kimmel
P.O. Box 159
Leverett, MA 01054

❖ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

①

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

We attended the session in Hadley. We found your explanation very informative. However at your invitation we are offering the following comments. Some of these comments you may have already been given, however they are worth repeating.

1. East side of Cooley bridge - You mentioned that plans have already been drawn for the approach to the bridge from the East. However in our opinion Cross Path Road should be closed off. Traffic coming from the University comes down Rocky Hill (sometimes by way of Mt Warner and Breckenridge) then to North Lane, Hurd st, Cemetery road to Cross Path. These roads are not built for this type of traffic. It is dangerous to the neighborhood. Traffic should be routed on 116 to route 9 via a natural flow to the bridge. Similarly Bay Road flowing into route 9 creates traffic tie-ups and slows down movement to the Bridge. There needs to be a more natural flow at this intersection. Will a 4 lane Route 9 solve this problem?

2. Route 47 and Bay Road - There needs to be more consideration given to the traffic flow south on 47 and east on Bay Road. These roads are busy now, and will become more so as South Amherst and Belchertown continues to grow ..... and they will.

3. Route 47 and Mueller Bridge - We often avoid the bridge by going south on 47 to the Mueller Bridge. Sometimes using Alvord and Lathrop to get to the rotary. The Mueller Bridge is a 4 lane bridge that connects to Route 202 and eventually to 91 and 391. However more thought should be given to the Holyoke side of the bridge. The use of Hampden, Beech or Lincoln Streets does not encourage the use of this option to getting to 91, or from 91 to South Hadley and Amherst. Some planning should be given to this problem. → If more accessible, some traffic crossing Cooley bridge and then going south on 47 to South Hadley could be kept on 91 and then crossed at the Mueller Bridge. At present this 4 lane bridge is not fully utilized in solving traffic using Cooley bridge

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Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

②

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

to get to South Hadley. Consider Hampden, Beech & Linden streets having no on-street parking or at least only one side parking for the entire approach to the Bridge. Better a new access road from 91 to Mueller would maximize the use of Mueller Bridge.

4. Bridge at Exit 18. A future bridge may be necessary at this location - traffic will increase in the area because of growth in South Amherst and Belchertown. The old plans of extending 116 south of Route 9 connecting to a new road (or Bay Road) leading to exit 18 may be necessary. Similarly a new road may be necessary to connect to Belchertown and eventually to the turnpike somewhere near Palmer. There is an old rail r/w near Route 181 that could be used for this purpose. This new road from exit 18 to the Mass Pike could route traffic out of Southern Amherst and Belchertown that is beginning to be a major problem ... and will be more so in the future. Furthermore it provides a more convenient access of Amherst and UMass to the eastern part of the State. The future of UMass will be connected administratively as well as programs and students to the eastern part of the state. Also the new connector could do much to economically develop the communities between Belchertown, the pike and surrounding area. It could move some of the excess development in the eastern part of Mass to this area. Also it may take some of the traffic that avoids 181 and goes by way of 91 to the pike and eventually to Boston ... especially when there is bad weather. In other words consider moving more of traffic east, that uses the Coolidge Bridge to get to Boston. I know we would use it rather than weaving our way from Amherst to Palmer on the old 2 lane roads to Palmer!

Again we appreciate your information program and hope that your plans will be funded by the state.

Sincerely

A.T. & M.J. Krzystofik
4 Quinlan Drive
Hadley, MA 01035-9651

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Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

COUNCILORS

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James M. Dostal

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4 Rita M. Bleiman
5 Alex D. Ghiselin
6 Marianne L. LaBarge
7 Raymond W. LaBarge

CITY COUNCIL

CITY OF NORTHAMPTON

MASSACHUSETTS

December 10, 2003

Mr. Wayne Feiden
City Planner
City of Northampton
City Hall
Northampton, MA 01060
FAX 587-1264

Dear Mr. Feiden,

I am responding to the reports of the public hearing pertaining to the bridge problem that were carried in tonight's newspaper. Unfortunately I saw no notice of that hearing beforehand, so I did not attend it and am unaware of the details of the proposals. As City Councilor for Ward 3, I would like to weigh in with one consideration nonetheless.

The building committee for Damon Road, on which I sit, also wanted more on and off ramps for I-91. Vanasse et. al. did the engineering for that project and could find no way to do such ramps, so they were abandoned as part of the plan, whereas in the current discussion it seems assumed that they can be easily built.

I would like to say that whatever plans are developed must take into consideration the integrity of Ward 3 neighborhoods. In the current instance, I do not believe that it will be acceptable to this area of town for any plans to be drawn up that will compromise the integrity of the neighborhood west of I-91.

Could you please pass a copy of this letter to the commission involved?

Many thanks,

Maria Tymoczko

Maria Tymoczko
Councilor for Ward 3

cc: Marilyn Richards

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

◆ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

I am very impressed by the depth and sophistication of your study and the reasoning which supports your conclusions. In particular, I agree that better signals at the Sunderland bridge and the Coolidge Bridge and a re design of the I-91 exits at route 9 is the most reasonable solution for the foreseeable future. I also very much appreciate your concern for impacts on floodplains and historic districts if a bridge were built and roads constructed through southern Hatfield.

George H. Ashley
Sec'y, Hatfield Historical Commission

Mr. George Ashley, III
[illegible]
Hatfield, MA 01038

◆ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

I speak for all of my Hatfield neighbors when I thank you for taking into account, in your study, not only traffic efficiency but also the values of environmental soundness, natural + wildlife resource protection, farmland protection, and neighborhood/historic district protection. I have to cross the Calvin Coolidge bridge every day on my way to Mount Holyoke College, where I work. I would rather sit in traffic, if need be, than destroy any of the small towns along the river for the sake of the automobile. Unfortunately, Hadley has chosen a form of sprawl commercial development that has led to clogged roads – but the last thing we want to do is to turn other towns into gas station centers, highways, bridges, cloverleaves, etc. to ease the flow of ever greater numbers of cars to a multiplying number of Route 9's.

Alas, even wider highways attract more cars, leading once again to automobile saturation. We really need a regional approach to development, so that older cities such as Holyoke can become the centers of new commercial development. All those red brick factories are just waiting for a "smart growth" new use. Then residents from Holyoke + the region can come to Hatfield to hike, bike, pick berries, and swim in a (one day) cleaner Connecticut River – and also find new jobs where they live.

I like the idea of "smart buses" but don't think all those cameras on the roads are good for another important value: individual privacy and liberty. Is there any chance of planning for a light rail system on a continuous loop between the colleges, Holyoke, Easthampton, Hadley, etc.?

❖ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

Joan Cocks
44 Main St
Hatfield MA 01038

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

good, clear presentation. thanks.

❖ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

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Watertown, MA 02471
Attn: Laura Castelli

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

① What about light rail between Amherst and Northampton?

People are not going to get out of their cars!

❖ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

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101 Walnut Street PO Box 9151
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Attn: Laura Castelli

Connecticut River Crossing Transportation Study
Public Information Meeting - December 9, 2003

Comment Sheet

❖ Please provide us with any comments you may have regarding the public information meeting, the proposed improvements or the study in general (use back of form if necessary)

① Please consider a Left Turn Lane at the intersection of Rt 116 and Plum Tree Road in Sunderland. Very dangerous left turn heading north

There have been numerous car accidents because people are not paying attention and driving too fast on Rt 116 N.

② BIKE PATH EXTENSION
– CREATE OVERPASS @ DAMON ROAD
so Bike Riders can cross road. Norwottuck Rail Trail Extension.

③ Please do not widen the bike trail

❖ Thank you for your input. Please submit your comments here tonight or mail them back to the following address by December 15:

Connecticut River Crossing Transportation Study
c/o Vanasse Hangen Brustlin, Inc.
101 Walnut Street PO Box 9151
Watertown, MA 02471
Attn: Laura Castelli

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF CONSERVATION AND RECREATION
CONNECTICUT RIVER VALLEY REGIONAL OFFICE
P.O. BOX 484, 40 Cold Storage Drive, Amherst, MA 01004-0484
PHONE: 413-545-5993 FAX: 413-545-5995 *www.mass.gov/dcr*

Mitt Romney
GOVERNOR

Kerry Healey
LIEUTENANT GOVERNOR

Ellen Roy Herzfelder
SECRETARY

Katherine F. Abbott
COMMISSIONER

Ethan Britland 12/26/03
Transportation Planning
Massachusetts Highway Department
10 Park Plaza
Boston, MA 02116

RE: Connecticut River Crossing Study
Department Response

Dear Mr. Britland,

On behalf of the Department of Conservation and Recreation (DCR), I would like to discuss the recommendations stated in your consultant's presentation on the Connecticut River Crossing Study. These recommendations were proposed as ways to reduce vehicular traffic crossing the river. Many of the items listed will have an impact on DCR land or infrastructure. Our comments and concerns regarding these recommendations are as follows:

1) The need for Park and Ride lots in Northampton. Presently many motorists use the Norwottuck Rail Trail parking lot on Damon Road as a park and ride carpool lot given its superior location off of I-91 and proximity to Route 9 and the Coolidge Bridge. This is becoming an increasing problem as the parking lot frequently fills with motoring commuters thereby leaving limited parking for users of the Park, the Elwell Recreation Area and Connecticut River boating launch. This also creates traffic and safety concerns when the lot fills and vehicles are parked illegally on Damon Road. This also creates a huge demand on our toilet facilities at the Connecticut River Greenway State Park. The topic of expanding the Rail Trail parking area has been raised in prior discussions with MassHighway. We have proposed that the property located to the north of the Trail adjacent to DCR's rail trail parking be purchased to facilitate the reconstruction of the Coolidge Bridge by providing a space for construction office space and materials and would also provide a permanent solution to our parking shortage. The purchase would also provide a location for the construction of drainage BMP's that should be installed as part of the Damon Road reconstruction and future Rte 91 ramp construction projects. See #3 below.

2) The need for Park and Ride lots in the Sunderland area. There are two small parking areas at the base of Mt. Sugarloaf State Reservation that are used by those that walk the park and use the ball field adjacent to the park.

These areas are also used as commuter park and ride lots and could be enlarged and improved to provide additional parking spaces. It should be noted that there is a Mass. Highway garage on Rte 116 a close distance from the park that has a large paved area that could be used for commuter parking. This facility is on the bus route and a bus stop could be added.

3) Improvements to Damon Road. Proposals for new access ramps have been investigated to provide access to Rte 91 from Damon Road and Rte 9. A study was prepared by VHB for the City of Northampton in 1998 detailing several ramp configurations that could be constructed as a part of the Damon Road reconstruction project. It is important that any proposed changes in the intersection of Damon Road and Rte. 9 be designed to coordinate with DCR so that improvements will also maximize safe public access to and use of this important recreation facility. Such changes or improvements could include the installation of a Rail Trail bridge over Damon Road to connect with the proposed extension of the trail to Woodmont Road and the construction of a visitor's center/bathroom at the intersection. The present building on the property is being used as an office for the bridge reconstruction. It is scheduled for demolition at the end of the project. The visitor's center would be built in the footprint of the old building.

   Any proposal should include the reconstruction of the drainage systems that discharge to the river directly to the north of the Rail Trail. These systems are disintegrating and the channel carrying the storm water discharge to the river is jeopardizing one of the rail trail bridge abutments. Mass. Highway has several catch basins and drop inlets that are piped into this system from Rte 91. Mass. Highway and the City should cooperate in a joint design and repair of the outfall as a part of the reconstruction of Damon Road. The purchase of the Krok lot (currently a used car lot) north of our trailhead, as listed in item #1 above, would facilitate the reconstruction of the outfall.

   It is our understanding that the drainage system outfall is the collection point for several drainage systems including one that captures runoff from the Marshall Street area south of Rte 91, several catch basins on Rte 91 and flow from Damon Road. A second drain line carries flow from the industrial park and two of our catch basins.

   Both of these systems are connected to the outfall at Old Water Street. The status of this road is unknown. Whether it is owned by the City, State or abutters, if it is still a public way, or has been abandoned or discontinued, is not clear. The immediate downstream drainage channel is on land owned now or formerly of Joseph Krok, the Department's abutter to the north. This channel has slowly meandered onto our land at the edge of the river.

4) Improvements to be made to the bike trail system including widening the trail and a bridge over Damon Road. The Norwottuck Rail Trail is ten years old and there is considerable root damage to the pavement. We recommend repairing the damage and possibly widening the trail to accommodate growing use. Under similar conditions on the Cape Cod Rail Trail, we are removing roots, installing root barriers, widening the trail from 8' to 10', and pulverizing and reclaiming the pavement.

It should also be noted that the Rail Trail Rte 9 tunnel access in Hadley needs to be realigned for safety reasons. The owners of the Long Hollow Bison Farm, abutters to the north of the tunnel location, have offered to donate a portion of their property to allow the project to proceed. Negotiations with the owners, Fred and Paul Ciaglo, should begin immediately.

We thank you for the opportunity to add the Department's views to your report. We believe that all parties will be able to work together to address these important issues to the benefit of surrounding communities and the environment. Please feel free to contact me in my Amherst office at (413) 545-5993 or contact my engineer, Richard Brazeau at the same number.

Sincerely,

Gary Briere, Acting Regional Director
Massachusetts Division of State Parks

From: James D. Lowenthal [james@earth.ast.smith.edu]
Sent: Tuesday, December 23, 2003 12:53 AM
To: Castelli, Laura
Subject: Route 9 "improvements" (fwd)

Dear VHB,

Following is a letter to the editor of the Daily Hampshire Gazette I just sent. I realize that the official deadline for comments on the Connecticut River Crossing Transportation Study was yesterday, but I hope that you will still be able to accept these as comments on behalf of MassBike/Pioneer Valley.

Thanks very much for your hard work on this project. I'm especially grateful that you weighed social and environmental costs into the analysis

In general, I think you should replace the (obsolete?) word "improvement" in your report with something more specific, such as "widening". An improvement for one mode (driving) is not necessarily an improvement for other modes (biking, walking...). HOWEVER, if widening Route 9 to four lanes meant that one lane in each direction could be an HOV lane including buses, THEN I'd be ready to endorse it!

Thanks again,

Sincerely,

James Lowenthal

~~~~~~

James D. Lowenthal / Asst. Professor / Five College Astronomy Department
Clark Science Center / Smith College / Northampton, MA 01063
Office: (413)585-6995 / Home: (413)586-4088 / FAX: (413)585-3786
james@earth.ast.smith.edu / http://earth.ast.smith.edu/james

---------- Forwarded message ----------
Date: Tue, 23 Dec 2003 00:48:33 -0500 (EST)
From: James D. Lowenthal <james@earth.ast.smith.edu>
To: opinion@gazettenet.com
Subject: Route 9 "improvements"

To the Editor:

You reported on Dec. 10, 2003 ("Bridge isn't the answer") that engineers from Vanasse Hangen Brustlin Inc. found insufficient need to build a new bridge across the Connecticut River in this region, but that several "improvements" were recommended to relieve congestion. These include widening of Route 9 in Hadley to four lanes and various new exits and on-ramps to I-91.

If widening Route 9 and adding on- and off-ramps seem like good ideas, please consider the following two questions: (1) What difference in your personal driving habits would less congestion on Route 9 have? Chances are that many more people will choose to drive on the new, temporarily less-congested artery, soon clogging it with even more traffic. (2) If expanding capacity to relieve congestion hasn't worked for more than a few short years anywhere else in the world, why should it work here? We've been incrementally widening highways to accommodate cars for 100 years now, in a vicious cycle of build-drive-build-drive. Eventually we'll have to bite the bullet and
~~~~~~

accept congested traffic as a fact of life.

Real improvements would emphasize incentives to bike, walk, or take public transit, including suggestions that VHB made but that weren't listed in your article.

Sincerely,

James D. Lowenthal
President, MassBike/Pioneer Valley
181 Crescent St.
Northampton, MA 01060
413-586-4088

From: ELAINE JANDU [emjandu@yahoo.com]
Sent: Monday, December 22, 2003 8:36 PM
To: Castelli, Laura
Subject: Bridge isn't the answer

12/22/03

Lisa,

I read the article in the Gazette dated 12/10/03 concerning the bridge traffic.

I live at 42 Hubbard Avenue. Where do you propose the new exit will be southbound? We have a quiet neighborhood which would be extremely upset with an exit ramp in the neighborhood.

Please inform us to when an additional meeting is concerning this topic. Please let me know exactly where the southbound exit would be placed.

Sincerely,

Elaine Jandu
Concerned Neighbor

Do you Yahoo!?
New Yahoo! Photos - easier uploading and sharing.
http://photos.yahoo.com/

From: csdixon [csdixon@charter.net]
Sent: Monday, December 22, 2003 8:33 PM
To: Castelli, Laura
Subject: Valley Traffic Study Comments

To Whom It May Concern,

I am writing to comment on the Ct. River Crossing Transportation Study. I'm grateful for the extension of the public comment period to today, Dec. 22 and, as usual for me, I'm getting in just under the wire ;). I attended the presentation of the Study's findings in Northampton earlier this month and found it to be very well done. I offered a few comments that night but would like to expand upon them a bit here.

First, I am very glad that a second bridge across the Ct. River was not recommended. It frankly caught me a little by surprise that a span in my neighborhood, Rt. 47 near the Holyoke Range, was even being considered but I'm glad that, according to your report, it was dismissed almost immediately. The area where Rt. 47 meets the river is a valuable natural resource for our area and the State has spent considerable moneys in recent years to preserve land that serve to connect the Holyoke Range State Park (incl. the Skinner Reservation) with the riverfront. A recent threat of residential development on the slopes of the Holyoke Range had our town and beyond speaking very clearly about the desire to see these lands protected. Besides being a ecological disaster for this area of town, a bridge here at the south end of Hadley makes no practical sense IMO since it would send UMass/Rt9 traffic diagonally though Hadley on the various back roads. A northern span makes sense on paper if one accepts the argument that connecting UMass to I-91 via the shortest possible route is the answer, but your reasons for rejecting a bridge there (community, historic and resource preservation, cost etc.) are well founded IMO. As far as a northern connection, I think that a widening of Rt. 116 through Sunderland and Deerfield would be a much better 'fall back' position and frankly was a little surprised to see that option not mentioned in the presentation, if only as a possible long range recommendation.

The point I would like to make above all is that, in my view, the need for widening the remaining sections of Rt. 9 in Hadley is of the *utmost importance*. Your recommendations for improving other traffic points around the valley are good ones, but they all pale in comparison to the need for widening Rt. 9. Although I realize that the widening of Rt. 9 from the Coolidge bridge back to West Street in Hadley is already in the planning stage and thus was not specifically part of your study, I feel I must here again underscore the need to get that project moving *without delay*. Although completion of the bridge project will make the flow out of Hadley better, traffic will still bottleneck at the weakest link, i.e. at West Street. This was supposed to be part and parcel of the bridge project (which is, after all, itself simply a widening of Rt. 9) but will now extend the road construction and it's attendant problems.

Likewise, the widening of Rt. 9 from Rt. 47 east to Maple St. is an absolute inevitability. I respectfully submit that this project is *far* too important to be relegated to the 'long term' (10-20+ years) category of your recommendations. With the explosion of both commercial and residential development already on the books for the eastern part of Hadley (with more certainly to follow), plus the newly announced plans to expand the enrollment at UMass Amherst, this section of Rt. 9 promises to be a chokepoint far far sooner than said 'long term' IMO. In my view Rt. 9 is *already* a 4 lane road, just one that still has a couple of leftover two lane sections. I know that land taking and such for road widening is a long process and a touchy subject in any town, which is all the more reason to get the process moving without delay. I must admit that I find it a bit ironic that the "old guard" of Hadley that believe a landowner has the right to sell their property to developers without restriction are the same folks that will cry foul when it comes to land taking for road widening to serve those very developments (No longer can Hadley blame the traffic solely on UMass), but that's the tradeoff. Personally, if I lived on Rt. 9 I'd view a few less feet of front yard as a small price to pay for being able to get out of my driveway. Our valley is choking, and Rt. 9 is the obstructed airway- please help us!

Thanks for reading.

Chris Dixon
Hadley MA

Comments on Connecticut River Crossing Transportation Study -

While the study's recommendations to better accommodate future demand have much merit and promise, the bottom line conclusion that "..improvements in existing infrastructure will satisfy the region's long-term transportation needs" poses great risk and will be shown over time to be an unfortunate planning decision. Ultimately, a new bridge will be built and residents of the region will wish the current set of decision-makers and their experts had exercised better foresight.

I do not share the cynical view that the study's major finding concerning a new crossing was a foregone result, reflecting the philosophies of several major participants in the study such as the PVPC and the operational priorities of others such as Mass Highway. I think we are lucky to have such dedicated public servants and capable consultants involved in this project. I do, however, have serious concerns about the process and perhaps about the assumptions used.

I think it's unreasonable to allow such limited time for public comment. While Mass Highway did extend the period for comments by a week, there should be additional time for the public to participate in this phase of the process. Several weeks prior to the public information meetings I requested a copy of the full report from Mass Highway and was told it was not yet available. Nor, were copies available at the meeting I attended in Northampton. Instead, two pages of written summary were distributed. I think this is woefully inadequate and causes me to wonder how much depth of public understanding and informed comment is possible or sought. Although I'm sure that the methodologies utilized by VHB in the study are completely appropriate and that the Advisory Committee had opportunity to review key input assumptions, I believe the public should be given a chance to understand those critical assumptions. In weighing the costs and benefits of the northernmost new bridge alignment, for example, the Committee and VHB relied upon a projected 9% reduction in Coolidge Bridge traffic. I believe the traffic flow models used by the PVPC were cited as the source of this pivotal input. I simply don't understand how this number can possibly be so low, given the results of the origin-destination survey undertaken which showed that over 80% of the Coolidge Bridge eastbound traffic is destined for Hadley or Amherst. Will the wizards behind the traffic models please explain how these apparently contradictory numbers make common or uncommon sense?

I assume Mass Highway created the Study Advisory Committee. As I remember the composition of that Committee, as described at the Public Information Meeting, comprised elected officials, some local businesses, one or more lawyers, representatives from environmental organizations and the PVPC. While I have great respect for my State Senator and Representative, I have no idea if their staff who may have attended the Committee meetings fully represented my interests as a commuter. There were certainly organizations represented on the Committee which, *a priori*, could be expected to oppose a new bridge for environmental or other reasons. When I asked a Mass Highway representative at the Public Information Meeting in Northampton if the Committee included any advocates for the commuter interest in a new bridge, I was given the names of several Committee members who had "open minds". Perhaps it was felt that all those designated to be on the Advisory Committee shared a sufficient use of the Coolidge Bridge to adequately represent the commuter stake in the process. Wouldn't the composition of the Committee have been more balanced if an avowed new bridge advocate had been a member? One might also ask why wasn't public sentiment more systematically solicited through random sampling? Even non-random sampling would have been useful. Wouldn't attitudinal questions concerning the desirability of a new bridge have been reasonable to include in the origin and destination study performed?

Business considerations were among the evaluation criteria. But was the potential long-term economic development impact of a new bridge represented? If the University is to realize its potential as an engine of economic development for the region, wouldn't more direct and efficient access to its resources and nearby spin-offs be a factor to consider? In addressing the business-related impacts, how did the study represent the costs to commerce of even greater traffic congestion? It's well known that shoppers to the west of the river are often deterred from frequenting stores in Hadley and Amherst simply because of the traffic bottlenecks along Rte 9. Although the short to long-term improvements identified in the study will certainly help to manage the traffic, it is far from obvious that they will solve the problem. Adding additional 4-lane sections to the corridor will not ultimately remedy the issue. The problem will become exacerbated if and when large box retail enterprises currently in planning become a reality. A new bridge and limited access connector would tend to be used by employed and student traffic, leaving more commercially generated traffic to use Rte 9.

The brief description of the environmental criterion provided in the summary pages includes air quality. Perhaps the full report will make clear the specifics of what was included in this category of effects. Were the emissions from snarled bridge traffic projected and included? I recognize the land use and environmental obstacles posed by a new crossing, and I concede my understanding of those issues is that of a layman. Replicating acres lost to a new crossing is a complex undertaking to be sure. I consider myself to be an environmental advocate. I don't wish to minimize the environmental consequences of a new river crossing, but I don't view such a project as an egregious environmental sin or as causing an unconscionable series of externalities.

As in a study of a new river crossing performed in the 1980s, permitting difficulty is proffered as a reason not to move forward in developing plans for a new crossing, even as a contingency plan. (It was pointed out in the public meeting that this current study did NOT include any scenario analysis that is common in long term, strategic planning.) The summary states that "Permitting would be a difficult and lengthy undertaking." When I read this, I alternate between fuming and shaking my head in disbelief. SO WHAT if it's a lengthy and difficult process! I don't need planning people paid by tax dollars to tell me that an important infrastructural improvement for the region represents too much hassle and paperwork. In fact, I am outraged by such an argument. Beyond inviting accusations of self-serving rationalization, it is more than a little patronizing to forego further work because there's too just too much work to be done.

I am disappointed by the bridge-related results of the current study. But I am confident the idea has not been put to rest.

Respectfully,

Rob Stinson
21 High St.
Haydenville, MA
413-268-3594

David Elvin
57 Huntington Road
Hadley, Mass., 01035

December 22, 2003

Connecticut River Crossing Transportation Study
c/o Laurie Castelli
Vanasse Hangen Brustlin, Inc.
101 Walnut Street
P.O. Box 9151
Watertown, MA 02471

SUBJECT: Comments on December 9, 2003, Public Presentations

Dear Madame/Sir:

I attended MassHighway's public meetings on the Connecticut River Crossing Transportation Study held on December 9, 2003, in Hadley and Northampton and offer the following comments on the presentations given at these meetings:

1. The public participation process for the study is inadequate.
I was very disappointed to learn that these meetings, which were held just three weeks before the conclusion of the 18-month study, were the first opportunities for general public input. As a result, there will be no opportunity for response to the numerous public comments in the final report. I understand that the Study Advisory Group did meet throughout the study, but broader public input during the setting of project goals and objectives could have helped the study avoid several large holes that it now appears to include. As a remedy, I strongly recommend that MassHighway extend the contract of the study consultant to allow for a full evaluation of public comments and for revisions to the study, if necessary, based on those comments.

2. The study fails to account for significant and known traffic increases on Route 9.
The study appears to be fundamentally flawed because it fails to account directly for more than 500,000 square feet of new high-traffic volume retail stores that is on the books in Hadley and due to open in 2005. The largest of these projects, the Lowe's and Home Depot shopping centers on Route 9 between North Maple Street and Mill Valley Road, will add some 14,000 additional trips per day to the existing ADT volume of 24,000 (sources: Home Depot Draft Environmental Impact Report, December 8, 2003, MEPA Project No. 13055; Fuss & O'Neill memo to Paradigm Development, September 25, 2003.) The magnitude of traffic growth accompanying these projects cannot possibly be accounted for in the 1.5% annual regional growth model used in the study, as the residential and other background growth will continue to occur (perhaps even at an even greater rate than 1.5% per year in the wake of this new development). The study must be adjusted to account for these projects, and the alternatives re-examined with respect to meeting a 2025 horizon year ADT in the range of 55,000-60,000 – not the 41,000-45,000 ADT on which the study is predicated. Mr. Wanat acknowledged at the evening meeting that some of the study's medium- and long-term recommendations may need to be accelerated to meet traffic growth in the near future (5-10 years). But where will that leave us in 2025?

3. The study fails to adequately examine Bus Rapid Transit.
The study corridor is well suited for bus rapid transit (BRT), yet the study fails to fully examine the possibilities of this transit mode. BRT would seem to be a nearly ideal fit with the characteristics of the corridor: there is a relatively high number of people traveling on regular schedules to a limited number of

destinations. Contrary to the consultant's rationale for dismissing BRT (and recommending a 'hybrid'), BRT does not require full lane separation along a the entire right of way. Indeed, as the MBTA's Silver Line is demonstrating with great success in Boston, BRT works well in mixed traffic. There are more than 20 BRT projects now in planning and operation around the U.S. I strongly urge the consultant to review these programs, as well as the Federal Transit Administration's BRT program, and perform a much more aggressive analysis of how a full-fledged BRT system could be made to work in the corridor. The cost of a full BRT system between Amherst and Northampton is comparable to that of a bridge, yet did not receive anywhere near the level of technical analysis as bridge crossings did.

4. The study does not examine a full range of demand management alternatives.
There are many additional options for reducing demand that the study did not seem to review seriously. These include restrictions on student vehicles at one or all of the five area colleges; flexible work schedules for employees of major area institutions; free bus passes or other employer-based incentives to increase transit use; parking fee increases to discourage single-occupancy trips; and others. Remote park-and-ride lots are not enough.

Thank you for the opportunity to comment.

Best regards,

David Elvin

Castelli, Laura

From: Hagelea@aol.com
Sent: Sunday, December 21, 2003 5:13 PM
To: Castelli, Laura
Subject: Comments: Connecticut River Crossing Transportation Study

Dear Ms. Castelli,

I congratulate VHB for their thorough analysis and subsequent creative solutions for the Coolidge Bridge traffic problems. The proposed Damon Road exit/entrance ramp serving northbound I-91 is particularly ingenious.

However, despite these changes, there is a good possibility that westbound Hadley/Amherst traffic to the Coolidge Bridge will still become congested, particularly during periods of high volume traffic resulting from college graduation exercises, football games, Mullins Center events, holiday shopping, burgeoning development, etc. I understand that flyovers from the Coolidge Bridge to I-91 were evaluated and found to be impractical due to the steep ramp slope necessary to service I-91 south. I would like to suggest that an elevated ramp, from the Coolidge Bridge to I-91 north only, be reconsidered because such a ramp would only have to rise to the elevation of I-91 and not over it, possibly resulting in an acceptable ramp slope.

Such a ramp would reduce left-turning northbound Damon Road traffic entering I-91 north. But most important, it would act as a relief valve allowing traffic to entirely avoid the signaled intersection by providing direct access to I-91 north. To further reduce the load on the intersection during heavy traffic conditions, even drivers wishing to travel south on I-91 could use this option to take I-91 north to interchange 21 and reverse direction.

In closing, I would add that I have walked the area suggested for the ramp, and to my untrained eye, it would appear that such a ramp might be feasible. Thank you for providing an opportunity to comment on the project.

Sincerely,
Edward Hagelstein
171 Nonotuck St.
Florence, MA 01062

E-mail: hagelea@aol.com
Tel.: 413-584-0212

From: Dodie Gaudet [dgaudet@valinet.com]
Sent: Friday, December 19, 2003 10:51 AM
To: Castelli, Laura

Laura Castelli
Vanasse Hangen Brustlin Inc.
101 Walnut St. P.O. Box 9151
Watertown, MA 02471

Dear Ms. Castelli:

Please accept this letter as a comment on the public information meeting which took place on December 9, 2003 in connection with the Connecticut River Crossing Transportation Study. I am writing you on behalf of the Open Space Committee, a subcommittee of the Conservation Commission of the Town of Hatfield.

First and foremost we were very pleased, particularly in light of the media publicity prior to the meeting, that your organization is not recommending a second bridge over the Connecticut River at this time. As you correctly pointed out, the environmental and social impact of such a bridge and its attendant approaches would be extremely severe at all of the four sites considered by the study. In Hatfield either of the two routes contemplated would cut through solid residential and farming neighborhoods, destroying buildings, relocating people and obliterating farms that generations have built up. Major highway construction through the center of Hatfield would wreak havoc with many valuable, historical sites. Much of the land that would have to be claimed for a bridge and its connecting highways would be either floodplain or wetlands, resulting in severe disruption of wildlife habitat and flood storage areas. Attracting streams of traffic through what is now a quiet, rural landscape would create noise and fumes that would blight and devalue adjacent residential neighborhoods. The volume of traffic into, out of and through Hatfield caused by a major transportation link would create conditions for explosive residential and commercial development in the years to come. The citizens of Hatfield have made it very clear over the past several years that such a prospect flies in the face of their vision for this community. Throughout the recently completed Master Plan process, town people stressed that they wanted to preserve the rural character of the town, including its working farms, open space and wildlife habitat. Several years ago the town vigorously and successfully opposed the construction of a proposed Home Depot near exit 21 off I-91. Only last May the Town Meeting officially voted to oppose any bridge construction into and through Hatfield.

We in Hatfield were very pleased by the fact that your study took all these environmental impacts into account along with the problems of traffic congestion, mobility and safety. We were also impressed by the fact that you gave them sufficient importance to outweigh the benefits of congestion relief that a bridge might bring to the regional transportation system. As residents of the Pioneer Valley we along with everyone else experience the traffic delays over existing river crossings and support measures to ease these pressures. But we agree with the findings of the study that, taking all factors into consideration, it is better to achieve these ends by a variety of transportation system improvements other than an additional crossing. A bridge would presumably solve some problems but it would create many others, far out of proportion to its potential benefits. We are gratified that your study took this larger and longer viewpoint, thus serving the needs of the entire region, not just one segment.

We also thank you for welcoming suggestions from the public both during and after the public meeting on December 9.

Truly yours,

Michael Coffey, Chair
Open Space Committee

Michael Coffey
141 Old Stage Rd.
W. Hatfield MA 01088
(413) 247-3119
dgaudet@valinet.com

From: Tom Miner, CRWC [crwc@crocker.com]
Sent: Thursday, December 18, 2003 2:27 PM
To: Castelli, Laura
Cc: Bacon, Mary Jane; Blair, Alan; Bonsignore, Ruth; Brennan, Tim; Britland, Ethan; Castelli, Laura; Clark, Glen; Conron, Christine; Crosbie, Robin; Curtis, Regina; Delude, Ken; Dunlavy, Linda; Hess, Marie; Higgins, Mary Clare; Hubley, Robie; Jacques, Alan; Judge, Robert; Klausner-Wise, Jan; Knapik, Michael - Sen.; Kocot, Peter - Rep.; Kuhlman, Kerry; Kulik, Stephen - Rep.; Lacourn, Neils; Mandell, Meryl; Marquis, Rick; Miller, Kenneth; Mitchell, Bob; Mullaney, Maureen; Rosenberg, Stan - Sen.; Roux, Gary; Scibak, John - Rep.; Sheehan, Sandra; Shuldiner, Paul; Simmons, Paula; Souweine, Jonathan; Stegemann, Albert; Steinkamp, Judith; Story, Ellen - Rep.; Szynal, Diana; Tautznik, Michael; Wanat, Joseph; Wilson, Keith
Subject: CT River Crossing Transportation Study

Dear Laura,

The following are the comments of the CT River Watershed Council (CRWC) on the "CT River Crossing Transportation Study" that was released to the public last week.

CRWC wholeheartedly endorses the study recommendations, especially the conclusion that a second bridge is not warranted. I also want to express our appreciation to VHB and MassHighway for its approach to the study. From the onset, you actively involved the Advisory Committee and took advantage of its diverse representation and expertise to help develop and refine the study, its findings, and recommendations. The result is an action plan with great significance and promise for the future of the Pioneer Valley.

The study summary that was presented at the two public meetings on December 9 did not mention an important issue that was a major focus of the final meeting of the Advisory Committee. That issue is the integral nature of land use regulation in Hadley and the future capacity of Route 9. There was consensus, as I recall, that continued expansion of shopping malls and "big box" retailers could quickly consume the added highway capacity to be created by the improvements recommended by the study. The same issue relates to the planned growth of the University of Massachusetts. CRWC believes it is very important for MassHighways to continue an active dialogue with the interests represented on the Advisory Committee to address future growth, some of which is imminent, and measures to control increased highway demand.

A related issue, which was also missing from the presentation, is traffic reduction. We need to find creative ways to encourage and provide for increased use of public transportation, ride sharing, and other measures to decrease the number of cars that travel the Route 9 corridor daily from Florence to Amherst. This should be a public priority. Simply building more highway capacity is not the answer.

It has been a pleasure to represent the Watershed Council as a member of the study Advisory Committee. I learned a lot from my fellow committee members, as well as from VHB and MassHighways. Hopefully, we created a model approach for future highway projects in this region.

Now comes the hard work, transforming the study recommendations into reality.

Thank you, and happy holidays.

Tom Miner
Executive Director

Tom Miner, Executive Director
CT River Watershed Council
15 Bank Row - Greenfield, MA 01301
413/772-2020 Fax 772-2090
www.ctriver.org

Paul M Styspeck, P.E.
Consulting Civil Engineer

3 West Street
Hadley, MA 01035

To: Vanasse Hangen Brustlin, Inc.
From: Paul M. Styspeck, P.E.
Date: December 16, 2003
Re: Connecticut River Crossing Transportation Study

I was in attendance for the presentation for the Connecticut River Crossing Study on December 9, 2003 in Northampton. I would like to commend you on a presentation well done and your thorough research on the subject. I would like to add some commentary because I live in an area directly involved with the traffic congestion on Route 9 and have to travel through it each day. Having to deal with the growing traffic problems can be tortuous at times and seems only to be getting worse. Getting to Northampton from Hadley between the days of Monday to Saturday between 3PM and 7PM are impossible in a timely manner. Furthermore, with the growing businesses along the Route 9 corridor through Hadley, it is becoming increasingly difficult to travel East along Route 9 from Northampton. I have lived in Hadley for over thirty years and have a very good grasp on the traffic patterns in this area and how they are affected by Route 9 and the River Crossing. Therefore, I would like to itemize my comments below:

1- The scheme of constructing Interchange 19 ramp connections is a great idea! The traffic signal on the Northampton side of the Coolidge Bridge is a huge traffic impairment. A continuous flow of traffic through this intersection would greatly improve the flow along Route 9 through Hadley. It will be interesting to see how traffic flows once the Coolidge Bridge Project is done and there will be four lanes crossing the River once again. The Route 9 Widening Project may also help once the funding is in place and is constructed. But I believe that is only the beginning. Constructing the ramp configurations in Northampton once the widening Project is complete could be the icing on the cake!! However, I noticed that the study recommends this solution as a 'Long-Term Recommendation! I strongly disagree with this assessment and believe that it should be re-prioritized into the short term.

-2- Short Term Recommendations including the traffic improvement schemes for such areas as Route 116 at River Road and Route 116 at Bay Road (among others) are fine ideas and probably should be addressed. But I fail to see how these intersections impact any of the traffic traveling over the Coolidge Bridge into Northampton. Travelers do not avoid those intersections to avoid the Route 9 area. Rather, people stuck in traffic on Route 9 have no other choice but to travel through this corridor. Therefore, we need another corridor to travel over to a Route 91 South connection. See point #3.

-3- I travel through the intersection on the West side of the bridge every day and have been noticing the travel patterns for years. Despite the data that leads to a majority of vehicle traveling to Northampton from Hadley, I have noticed that a huge amount of that traffic enters the on-ramp for I-91 South. If I had to guess, I'd say that at least

30% of the traffic gains access to I-91 South. Again, I notice this from sitting in traffic in this intersection every day. Therefore, if the traffic is traveling to the south of the Northampton area, a separate route from the Amherst/Umass/The shopping mall area would severely ease the congestion. These travelers are not headed to the Hatfield area or I-91 North. People traveling in that direction and destination take Route 116 and cross the Connecticut River on the Sunderland Bridge. Thus, the three proposed Bridge location into Hatfield would be a waste. The first proposed bridge site connected Route 47 in Hadley to Route 5 in Northampton. You were on the right path with that idea. If that particular site did not work due to various constraints, please look again. Routes 47 and 5 are both State owned roadways that would be easier to upgrade than any local roadways. Did you consider a crossing that would be approximately one mile south of the study site? A crossing that would connect with the intersection of East Street/Route 5 in Easthampton would be ideal in my opinion. This route would allow travelers to the Easthampton area to completely bypass Northampton and the Coolidge Bridge altogether. Also, traffic heading to parts South of Northampton on I-91 (Holyoke, Springfield, Connecticut,...etc.) could also by-pass the Coolidge Bridge if a ramp scheme could be designed. I realize that there would be conflicts with the existing railway and at-grade intersection with Route 5, but in Engineering there is a solution to every problem! PLEASE consider this option again. Allow the free travel between Amherst and Northampton once again!

4- Lastly, vehicles currently utilize Cemetery Road in Hadley (off of West Street) to attempt a 'short cut' around the Route 9 traffic. This 'short cut' dumps traffic onto Route 9 West near the Coolidge bridge. During rush hour, cars can back up as much as one mile on this rural road. Access to Cemetery Road is gained from West Street which happens to be the most historic area in the Town of Hadley. West Street is where the Town Common is located and many homes are on the list of National Historic homes. Needless to say, this is not the type of neighborhood where an average of 6000 vehicles (at last count) travel daily. It is only a matter of time until the Town of Hadley wakes up and disallows this cut-through. When that day comes, this reserve area (for vehicles) will be forced back onto Route 9 which will certainly cause the traffic to back up daily though the intersection of Route 47 and 9. Today, that only happens on Saturday afternoons. Please take this fact into account on your final study.

If you have any questions, please contact me at (413) 585-8188 or write to the above address. Also I can be reached at P.Styspeck@verizon.net.

Sincerely,

Paul M. Styspeck, P.E.

Castelli, Laura

From: Stahl43@aol.com
Sent: Friday, December 12, 2003 11:37 PM
To: Castelli, Laura
Cc: StahlGP43@aol.com
Subject: (no subject)

Unfortunately I only had the news article to glean details from but from what I read the plan is a halfbaked plan at best. My understanding of the plan is outlined #1 thru 6 below. If I am mistaken I would like to be corrected.

tructures that truly keep traffic moving,eg. elevated roadways, tunnels, overpasses,etc. [like the BIG DIG] are not mentioned. Your plan simply dumps most of 91N/S departures onto Damon Road instead of 9. Basically it just "moves" the problem. The congestion at Damon Road as it exits onto 9 will become even worse.

I do not believe that any solutions at this spot will preempt the need for a new bridge ultimately. It may delay urgency. I would suggest that the new bridge plan not be shelved for another 20 yrs or it will cost twice $26MM. However if you're bent on doing this Band-Aid approach try doing it right or as right as logical minds suggest. By right I mean that A,B,C below need doing. Thank you.

1. 91S to 9 E/W, new exit, 9E puts more traffic on Damon requiring a **left** to get onto 9E. This traffic now on a scale of 1 to 10 is -2!
2. 91N to 9E, ok as is
3. 91N to 9W, new exit, backtracking [Damon S] to 9 to head west, more traffic dumped on Damon, may need **light** to enter 9W flow.
4. 91N to Damon N, must cross 9 [light req] as it does now or new exit dumping on Damon beyond 9 requiring a **left** onto Damon N [would need a light] OR could be done with a *flyover*.
5. 9W to 91S, **left** turn required at current ramp on 9 [light to control traffic?]
6. 9W to 91N, new ramp, turn onto Damon N then a **left** crossing Damon S traffic [light reqd] onto new ramp OR could be a *flyover*.
7. Damon S to 91S, right onto 9W then **left** onto 91S at current ramp on 9. This adds to what is proposed in #3.

A. #4 & 6 above need flyovers to eliminate traffic lights
B. Entrance to 91S from Damon with new ramp. Eliminates need to get onto 9W and makes #7 moot.
C. #5 needs to be a flyover eliminating the left turn from 9W across 9E to get to 91S.

ERic Stahlberg
PO Box 815
Easthampton, MA 01027

Castelli, Laura

From: William LaChance [mksmts@comcast.net]
Sent: Friday, December 12, 2003 2:44 PM
To: Castelli, Laura
Subject: Bridge Solutions ?

72-1 Could drivers at the King St./Damon Rd. intersection be made aware of the 91 South entrance at the exit 21 interchange ? That may lessen some of the traffic headed East on Damon Rd to get to 91S. Most of us "locals" realize that three minutes of driving on North King St. saves 1/2 hour of sitting on Damon Rd.
Just a thought. Thank you.

Bill LaChance

Castelli, Laura

From: betty landry [bettyl@acad.umass.edu]
Sent: Thursday, December 11, 2003 1:46 PM
To: Castelli, Laura
Subject: RE: Coolidge Bridge & Rt. 9

The Daily Hampshire Gazette article indicated that drivers who use this route regularly could indicate their findings/feelings to this website.

I have been commuting for 12 years from Southampton, MA to Amherst, MA. This would be 18 miles, as the crow flies. As I start my workday earlier than most of the staff at UMass/Amherst (primarily to avoid even more traffic and wasted time), the morning commute is not that much of a hassle. On a good day, I can make the drive in 45 minutes. The evening commute is another story entirely. It can take anywhere from an hour to more than 2 hours, if weather and road conditions are a factor. Holiday times and college calendars play a big factor in the time required to commute too.

Often, I choose to do the river crossing via Rt. 116 N. and the Sunderland bridge, especially in the evening. This adds another 12 miles each way to my commute; however, it can be much easier on the nerves.

During the summer months, I sometimes commute to and from my camp in the Monadnock area of Southwest New Hampshire. This is a 45 mile trip, one way. It takes an hour and fifteen minutes, since I stay on the East side of the river. Also, traffic is not much of a factor.

The primary problem with Rt. 9 and the Coolidge bridge crossing seems to be that the sheer volume of traffic cannot be accommodated. I have seen many scenarios tried out over these past 12 years. Some of the worst involved putting extra lanes for very short spaces at traffic lights. The cars would literally slam into each other while trying to gain a car length's advantage. These lanes didn't last for very long, thankfully.

Today's driver has no attention span or patience while on the road. The distractions are many (cell phones, etc.). It is truly horrific to see what people do while driving. When I learned to drive many years ago, we were taught that driving an automobile required all one's attention. I have found that to be true. It's impossible to predict what anyone/everyone else on the road is going to do.

The advent of the SUV has made the interstate highways into demolition derbies, especially in the Winter months. I have personally witnessed Friday afternoon SUV drivers on Rt. 91 North (ski traffic), speeding and clustering during bad Winter Event storms. They end up in the median or ditch. Then they proceed to upright their vehicle and drive in exactly the same manner.

I have digressed from the Rt. 9 area, but the above illustrates what I believe is a flaw in the driving mentality today. It's the same on smaller roads; there is so much traffic that speed is kept in check.

The Ct. River clearly should have had another bridge built a long, long time ago. I have lived all over the country and have never seen one river crossing expected to handle such a large daily volume of traffic.

Thanks for listening.

Betty Landry

From: David Elvin [delvin@rcn.com]
Sent: Thursday, December 11, 2003 9:53 AM
To: Castelli, Laura
Subject: CT river crossing presentation

Hi, Laura,

Thank you for the presentation in Hadley on Tuesday. I see that a link to download the presentation has been placed on the MassHighway webpage at http://www.state.ma.us/mhd/, but it is not functioning. Error 404. Just wanted you to be aware of the problem, if you are not already.

Also, the Hampshire Gazette printed the wrong zip code in their address for you are VHB in their story yesterday http://www.gazettenet.com/story.cfm?id_no=12100056

You may wish to ask for a correction. The reporter is Scott Merzbach at smerzbach@gazettenet.com

Best regards,

David Elvin
57 Huntington Road
Hadley, Mass. 01035

From: Anne Fine [jonanne@crocker.com]
Sent: Wednesday, December 10, 2003 10:27 PM
To: Castelli, Laura
Subject: Comment on CT River Crossing Study

TO: Laura Castelli
Vanasse Hangen Brustlin

I recently read about your firm's recommendations concerning future modifications to the Rt 9/I-91 interchange to improve traffic flow over the Rt 9 bridge from Northampton to Hadley. I applaud your decision not to pursue a second bridge in this area, which i believe would only generate additional traffic, and spawn more ill-planned development along Rt 9. I would like you to consider an additional issue, however, in your planning process. At present, access to the bicycle path across the Connecticut River from downtown Northampton is only possibly by proceeding east on Rt 9 and turning northward onto Damon Rd to the park and entrance to the bicycle path. Because of the high volume of traffic on Damon Rd, it is really not possible to reach the bicycle path by traveling southward. Until such time as the city of Northampton completes the connection of the bike path to downtown, underneath I-91, bicycles will be competing with cars in the intersection of Rt 9 and I-91. It would be a shame to make this situation any worse, which would reduce the usefullness of the bike path as connection between Northampton and the Hadley/Amherst area.

Thanks.

Jon Liebman
Florence, MA

Castelli, Laura

From: Keith Wilson [kwilson@frcog.org]
Sent: Thursday, December 11, 2003 1:13 PM
To: kwilson@frcog.org; Wanat, Joseph; Castelli, Laura; Ethan Britland; Bonsignore, Ruth
Cc: Dunlavy Linda; Maureen Mullaney
Subject: RE: River Crossing Press Coverage

Dear All again:

Here is a link to today's Editorial in the Hampshire Gazette.

http://www.gazettenet.com/story.cfm?id_no=12110117

Keith.

> -----Original Message-----
> **From:** Keith Wilson [mailto:kwilson@frcog.org]
> **Sent:** Thursday, December 11, 2003 12:55 PM
> **To:** Joseph Wanat, P.E.; Castelli Laura; Ethan Britland; rbonsignore@vhb.com
> **Cc:** Dunlavy Linda; Maureen Mullaney
> **Subject:** River Crossing Press Coverage
>
> Dear All:
>
> Fantastic job on presenting the findings of the River Crossing Study findings.
>
> Below are links to articles in Wednesday's Republican and Hampshire Gazette Newspapers.
>
> http://www.masslive.com/hampfrank/republican/index.ssf?/base/news-5/1071046157244541.xml
> http://www.gazettenet.com/story.cfm?id_no=12100056
>
> I have not seen any editorial responses yet, but will forward if and when I see them.
>
> Keith P. Wilson
> Transportation Planning Engineer
>
> Franklin Regional Council of Governments
> 425 Main Street, Suite 20
> Greenfield, MA 01301
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> kwilson@frcog.org

From: aixelsyd@hushmail.com
Sent: Wednesday, December 10, 2003 4:44 PM
To: Castelli, Laura
Subject: Comment on proposal for improvements on CT River

After reading the summary of the results of your analysis, I found it necesarry to comment due to lack of endorsement for a new bridge being constructed. As a resident of Damon road near the intersection I can offer a unique perspective on the proposed changes. I agree that the intersection needs some significatn redesigning, but where would you plan on placing the ramp that would allow NB access on Damon Road? In the restarunt or the residences nearby, neither option would ever come to fruition due to politics, never mind the impact on the rail trail.

Also, what possible logic were you using when you analyzed the mueller and sunderland bridges as affecting the volume of traffic flowing over the bridge? Do you really think that locals are going to goto Holyoke to cross? To Sunderland? I think not. Clearly this shows the reasons that a study should be performed with companies located in the region, those outside of it simply fail to grasp the non tangible aspects that would be readily apparent to local residents.

Secondly, I was horrified to read the alleged reasoning for not creating a second bridge, used negative environmental factors (easily rectified), taking of personal property (provided for under state and federal law), and taking of farm land (how much is used for new housing development?). Get with it, these are non reasons at best, you sound like NIMBY maniacs.

Thirdly, it again appears the proposal failed to account for growth factors in Hadley and Amherst. UMASS plans to construct additional dorms to house thousands more students within the decade, is that factored into the analysis, apparently not. A Lowe's and Home Depot (first in the local area) will shortly be constructed in the area, it appears the analysis failed to take this into account and the related development this will also spur. Furthermore, Hadley recently voted down any restrictions on residential growth, which again fails to be computed in your analysis. Face it, the study could not be more flawed. A second bridge is not a suggestion it is required and until one is built the local community will not rest.

Comply with the need for 2nd bridge or our political might will be allied against you. Our resistance will not be futile.

Gregory Bennett
120 Damon Road
Northampton, MA 01060

Concerned about your privacy? Follow this link to get
FREE encrypted email: https://www.hushmail.com/?l=2

Free, ultra-private instant messaging with Hush Messenger
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Promote security and make money with the Hushmail Affiliate Program:
https://www.hushmail.com/about.php?subloc=affiliate&l=427

Castelli, Laura

From: Gregory Beaumier [gbeau11@hotmail.com]
Sent: Wednesday, December 10, 2003 1:56 PM
To: Castelli, Laura
Subject: Coolidge Bridge Debacle

Why not a rotary or circle on the Northampton side of the bridge? Comparable to the one on the West Springfield side of the Memorial Bridge. I believe a rotary would move traffic much smoother. An on ramp to 91 North would also help.

Thank You,

Greg Beaumier

Winterize your home with tips from MSN House & Home.

Response to Comments

The following section itemizes specific comments received on the Connecticut River Crossing Transportation Study Public Informational Meetings (December 9, 2003). It should be noted that only comments that require a response are specifically addressed below, therefore it is possible that some letters are not referred to, however, all letters received are provided at the end of this section.

Comment received from State Representative Scibak

Comment There has been significant increase in pedestrian activity on Route 9 with the new Registry of Motor Vehicles Plaza and Shelter Workshop.

Response
This increase should be addressed as part of the as part of the Route 9 Corridor transit and roadway improvements.

Anonymous Comments

Comment I recommend a 5th lane on West Street as a left- turn location.

Response
West Street was not a study area intersection, however, ample width exists at that intersection for right-turning cars to maneuver around left-turning and through traffic.

Anonymous Comments

Comment To eliminate congestion at the bridge why feed traffic into it from Damon, rather toy with the idea of using Industrial Drive & drawing some proposed access to Rt. 9 further down Bridge Street.

Response
As much of the area between Route 9 and Industrial Drive is residential in nature, Damon Road, which is predominantly commercial and industrial, was viewed as the appropriate arterial to accommodate traffic. The study, however, did not examine shifting traffic patterns through Northampton.

Comments from Chris Curtis

Comment I do believe the best long-term solution of this location is a fly-over to connect Damon Road eastbound traffic to Route 9 eastbound without a traffic light. This could eliminate the traffic light at Damon Road altogether.

Response

As described in Section 6.2.2, fly over ramps are not feasible without impacting the existing Coolidge Bridge and adjacent neighborhood, due to the grade necessary to clear Route 9 and I-91.

Comments from Catalina Arrubla

Comment The big problem (the bridge on route 9) was resolve [d] for a time when there [was a] policeman directing the traffic and not the lights. The flow of traffic [from] Amherst going to Northampton was very efficient. So [that] means that a better design of lights on the bridge will make the flow of traffic more efficient, right away.

Response

Once the bridge construction is complete, a police detail will no longer be necessary. The recommended coordination between a new signal at the southbound ramps and the existing Damon Road signal will further improve westbound operations.

Comment I would like to see the possibility of closing the left-turn at the same light, coming from Northampton to Amherst.

Response

It is not desirable to restrict left-turns from Route 9 onto Damon Road. By restricting this movement, vehicles would have to cut through residential areas to access Damon Road and points north.

Comment I do hope we can get a light at Bay Road with Route 116. It is a very dangerous intersection.

Response

The Town of Amherst has begun the process of signal installation at this intersection as part of the Atkins Corner Plan.

Comments from Renee Fall

Comment I question why the only other public input came at the very end of the process and why more public meetings were not held at earlier points in the study period…This would have afforded regular citizens opportunities to learn about the methods of the study, options considered, and to provide additional feedback that would likely have resulted in a more thorough consideration and fewer questions at the study's end.

Response

This study actively engaged a Study Advisory Group, with broad representation from various local community groups and agencies, throughout the process. Outreach meetings were also conducted with local communities at a number of points during the evaluation of improvement alternatives.

Comment Since the study took place when reconstruction of the Coolidge Bridge was underway, the existing conditions do not represent "normal" traffic flows. Already by the time of the survey, drivers were adjusting their travel times, as well as routes, to avoid peak back-ups on the bridge…This makes it hard to know what "peak" hours would be when bridge construction is not happening. I hope the final study will address this.

Response
As discussed in Sections 2.3.2 and 2.5.3, the existing conditions analysis was adjusted to reflect non-construction conditions on the Coolidge Bridge. The Origin-Destination survey, as described in Section 2.6, specifically investigated whether congestion on the Coolidge Bridge altered drivers' travel patterns.

Comment I hope the final study will make clear the basis for traffic projections…It is not clear, for example, if growth at UMass is accounted for (and if so, at what rate)…if the proposed developments in Hadley, as well as very recent changes (Target and Trader Joe's)…are included in these projections.

Response
This information is provided in Sections 4.1 and 4.2 of this report. The traffic projections represent a "snapshot" of the future as it appeared at the time of this study. This report precedes the newly submitted environmental documents for retail development along Route 9 and plans to increase University size had been discussed but not formalized. It is expected that private developers and the University will use this study as a baseline for all future development, beyond the growth anticipated at this time, so that the proponents can adequately mitigate the impacts of their projects. It should be noted that the model projections for Route 9 in Hadley (which were approved by the Town of Hadley) include retail employment growth of approximately 468 employees and 8,000 attraction trips. This equates to just under 500,000 square feet of additional retail development[1].

Comment I hope the study will fully explore the potential of Bus Rapid Transit (BRT) and other improved public transportation options…I also hope the study will address how to increase public support for and use of public transit…We need to reduce the number of single-occupancy vehicles across the Coolidge Bridge, and I hope the study will make more recommendations about ways to do this using public transit.

Response
Sections 6.1.5 and 6.2.3 provide information on the detailed alternative mode analyses. Sections 7.1 and 7.2 provide recommended improvements related to these analyses.

Comment I also hope the study will address how employers, municipalities, and local businesses and institutions might become partners in solving the transportation problems…Can the study address how changes in commuting behavior might impact there overall transportation system? What might employers, businesses, colleges, and universities consider (e.g. incentives for finding the bus or car pooling; car-pool match-making; bicycle-friendly workplaces; flexible schedules; telecommuting, and so on) to encourage change?

Response
Much of this work was undertaken as part of the Route 9 Transportation Management Association (TMA) – see Section 5.4.2. Unfortunately, funding for the TMA has been recently cut and organized efforts towards less reliance on the single occupant automobile have been temporarily curtailed in the region.

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[1] Parking Requirements for Shopping Centers, Urban Land Institute (ULI), 1999

Comments from Roy Kimmel

Comment I find it hard to believe that traffic on Route 9 between I-91 and Amherst/UMass will only increase by 1 percent per year by 2025 Rampant big box retail outlets, future Mass Venture Center growth and other growth in the Pioneer Valley (whether well planned or not) will simply over burden the badly planned Rt. 9 in Hadley in short order... Rt. 9 in Hadley will continue to be an increasingly congested, dangerous and polluted strip indefinitely. Widening the Coolidge Bridge and marginally better access onto I-91 at the south end of Damon Road will help somewhat, but only for the short term.

Response

This information is provided in Sections 4.1 and 4.2 of this report. The traffic projections represent a "snapshot" of the future as it appeared at the time of this study. This report precedes the newly submitted environmental documents for retail development along Route 9 and no plans to increase University size have been moved forward. It is expected that private developers and the University will use this study as a baseline for future traffic projections and for all future development, beyond the growth anticipated at this time, so that the proponents can adequately mitigate the impacts of their projects. It should be noted that the model projections for Route 9 in Hadley (which were approved by the Town of Hadley) include retail employment growth of approximately 468 employees and 8,000 attraction trips. This equates to just under 500,000 square feet of additional retail development[2].

Comment I did ask when the widening of Rt. 9 from Coolidge Bridge to West Street would start and be completed…The Mass Highway web site provided no answer. Previous press reports indicated this work would start as soon as the bridge work was completed…

Response

A letter provided to the project team from Congressman Olver's office indicates that the project is scheduled to go to bid in June or July of 2004. Construction should start during either fall 2004 or spring 2005. This letter is attached at the end of the comment section.

Comments from A.T. & M.J. Krzystofik

Comment Plans have already been drawn for the approach to the bridge from the East. In our opinion Cross Path Road should be closed off…Traffic should be routed on 116 to route 9 as a natural flow to the bridge. Similarly Bay Road flowing with route 9 creates traffic tie-ups and slows down movement to the Bridge. There needs to be a more natural flow at this intersection. Will a 4 lane Route 9 solve this problem?

Response

The design plans for Cross Path Road provide for a right-turn into and out of Cross Path from Route 9 westbound only. The four-lane cross-section along Route 9 will ease traffic congestion at the intersection of Route 9 and Bay Road.

Comment There needs to be more consideration given to the traffic flow south on 47 and east on Bay Road.

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[2] Parking Requirements for Shopping Centers, Urban Land Institute (ULI), 1999

Response

These roadways were not specifically reviewed as part of this project. MassHighway should monitor traffic at this intersection and take action as necessary.

Comment More thought should be given to the Holyoke side of the [Mueller] bridge…a better, new access road from 91 to Mueller would maximize the use of Mueller Bridge.

Response

Improving access to the Mueller Bridge in Holyoke would require major circulation changes in the City that were beyond the scope of this study. Improvements at the intersection of Route 202 and Lincoln Street in Holyoke are recommended as described in Section 7.1.

Comment …a future bridge may be necessary at this location [Exit 18], as traffic will increase in this area because of growth in South Amherst and Belchertown… Similarly a new road may be necessary to connect to Belchertown and eventually to the turnpike somewhere near Palmer.

Response

As part of the bridge assessment, the project team investigated the transportation benefit of a new bridge south of the existing Coolidge Bridge. As discussed in Section 6.1.3, a bridge location to the south would not provide a sufficient transportation benefit to the west (and has numerous engineering obstacles to construction). Improved connections with the Turnpike are outside the scope of this study.

Comments from Maria Tymoczko

Comment The building committee for Damon Road, also wanted more on and off-ramps for I-91…the engineering for that project and could find no way to do such ramps, so they were abandoned as part of the plan, whereas in the current discussion it seems assumed that they can be easily built.

Response

The Damon Road study investigated the feasibility of providing a low-cost slip ramp from Damon Road to I-91 northbound. The alternatives discarded as part of the Damon Road Study were not discounted due to engineering feasibility, but rather the inability of this ramp to provide a traffic benefit to the Route 9/Damon Road intersection. (Because traffic destined to the interstate north is already on Damon Road, the alternative failed to divert any traffic off of Damon Road). The Connecticut River Crossing Transportation Study encompasses a much greater study area and looked more regionally, and much more in depth at the effects that a full interchange (not just a northbound slip ramp) at Exit 19 would have on Damon Road, Route 9, and Routes 5 and 10. As a full interchange, the cost-benefit to the region is much greater as it enables traffic to stay on the interstate longer (as apposed to having it travel on Routes 5 and 10 and local roadways) providing a more significant transportation benefit to the area.

Comment Whatever plans are developed must take into consideration the integrity of Ward 3 neighborhoods…I do not believe that it will be acceptable to this area of town for any plans to be drawn up that will compromise the integrity of the neighborhood west of I-91.

Response

The conceptual design of the alternative (provided in Chapters 5 and 7) took care to maintain the integrity of residential sections of Northampton potentially affected by the construction. As the design process moves forward, care will be taken to minimize residential impact.

Comments from Joan Cocks

Comment Is there any chance of planning for a light rail system on a continuous loop between the college, Holyoke, Easthampton, Hadley, etc.?

Response

Sections 6.1.5 and 6.2.3 provide the analysis conducted for light rail and electric trolley service.

Anonymous Comments

Comment What about light rail between Amherst and Northampton?

Response

Sections 6.1.5 and 6.2.3 provide the analysis conducted for light rail and electric trolley service.

Anonymous Comments

Comment Please consider a left-turn lane at the intersection of Rt. 116 and Plum Tree Road in Sunderland.

Response

This intersection was not reviewed as part of this study. This comment has been forwarded to the Franklin Regional Council of Governments.

Comment Create overpass at Damon Road so bike riders can cross road - Norwottuck Rail trail extension.

Response

Plans to provide a Damon Road overpass for bicyclists and pedestrians are currently being designed by the City of Northampton.

Comment Please do not widen the bike trail.

Response

As identified in Section 6.1.5, a feasibility analysis of widening the trail is recommended; however, the Department of Conservation and Recreation has jurisdiction over the Norwottuck Rail Trail between Northampton and Amherst.

Comments from The Department of Conservation and Recreation

Comment Presently many motorists use the Norwottuck Rail Trail parking lot on Damon Road as a park and ride carpool lot given its superior location off of I-91 and proximity to Route 9 and the Coolidge

Bridge. The topic of expanding the Rail Trail parking area has been raised in prior discussions with MassHighway. We have proposed that the property located to the north of the Trail adjacent to DCR's rail trail parking be purchased to facilitate the reconstruction of the Coolidge Bridge … and would also provide a permanent solution to our parking shortage. The purchase would also provide a location for the construction of drainage BMP's that should be installed as part of the Damon Road reconstruction and future Rte 91 ramp construction projects.

Response

As identified in Section 6.1.5, a single, expanded shared parking facility that can better accommodate both park and ride and bike trail users is recommended. This includes a study of the feasibility of acquiring land adjacent to the current Damon Road facility to provide the necessary spaces. A consolidated park and ride facility is a short-term (0 to 5 year) recommendation.

Comment There are two small parking areas at the base of Mt. Sugarloaf State Reservation that are used by those that walk the park and use the ball field adjacent to the park. These areas are also used as commuter park and ride lots and could be enlarged and improved to provide additional parking spaces. It should be noted that there is a Mass. Highway garage on Rte 116 a close distance from the park that has a large paved area that could be used for commuter parking. This facility is on the bus route and a bus stop could be added.

Response

As identified in Sections 6.1.5 and 6.2.3, a park and ride location in Deerfield is recommended as a short-term alternative. These two locations are among the four that have been identified as potential park and ride locations in the vicinity of the Sunderland Bridge.

Comment Proposals for new access ramps have been investigated to provide access to Rte 91 from Damon Road and Rte 9. …It is important that any proposed changes in the intersection of Damon Road and Rte. 9 be designed to coordinate with DCR so that improvements will also maximize safe public access to and use of this important recreation facility. Such changes or improvements could include the installation of a Rail Trail bridge over Damon Road to connect with the proposed extension.

Response

As the permitting process moves forward, it is envisioned that the MassHighway Department will work with the Department of Conservation and Recreation and other area stakeholders to maximize safety and use for all modes of transportation. The installation of a rail trail bridge over Damon Road is currently being moved forward by the City of Northampton as part of a separate study.

Comment Any proposal should include the reconstruction of the drainage systems that discharge to the river directly to the north of the Rail Trail. …MassHighway and the City should cooperate in a joint design and repair of the outfall as a part of the reconstruction of Damon Road. The purchase of the Krok lot (currently a used car lot) north of our trailhead…would facilitate the reconstruction of the outfall.

Response

The reconstruction of drainage facilities is outside the scope of this study. However, MassHighway, the City of Northampton, and the DCR should work together to address these issues, to the extent possible, as part of the Damon Road reconstruction project.

Comment The Norwottuck Rail Trail is ten years old and there is considerable root damage to the pavement. We recommend repairing the damage and possibly widening the trail to accommodate growing use. …It should also be noted that the Rail Trail Rte 9 tunnel access in Hadley needs to be realigned for safety reasons.

Response

As identified in Section 6.1.5, a feasibility analysis of widening the trail is recommended as part of this study.

Comments from MassBike Pioneer Valley

Comment I think you should replace the word "improvement" in your report with something more specific, such as "widening". An improvement for one mode (driving) is not necessarily an improvement for other modes (biking, walking...).

Response

The report specifically identifies "widening" of Route 9. In the evaluation of alternatives, the study team sought to define the trade-offs in benefits and impacts associated with each alternative.

Comment What difference in your personal driving habits would less congestion on Route 9 have? Chances are that many more people will choose to drive on the new, temporarily less-congested artery, soon clogging it with even more traffic. If expanding capacity to relieve congestion hasn't worked for more than a few short years anywhere else in the world, why should it work here?

Response

The recommendations suggested in this report are expected to reduce delay but are not expected to dramatically improve travel times or change travel patterns.

Comment Real improvements would emphasize incentives to bike, walk, or take public transit, including suggestions that VHB made but that weren't listed in your article.

Response

Press coverage of this study has tended to focus only on the bridge issue. Chapters 5 and 6 provide a detailed analysis of a range of alternatives developed and evaluated. Chapter 7 identifies recommended improvements for all modes of transportation in the region.

Comments from Elaine Jandu

Comment Where do you propose the new exit will be southbound?

Response

Chapters 5 and 7 provide conceptual improvement graphics showing approximate ramp placement (Figures 5-8 and 7-2). It is possible the location of the ramps could shift as the project moves into the design phase.

Comments from Chris Dixon

Comment I think that a widening of Rt. 116 through Sunderland and Deerfield would be a much better 'fall back' position and frankly was a little surprised to see that option not mentioned in the presentation, if only as a possible long range recommendation.

Response

As described in Section 6.1.2, Concept 19 included widening Route 116 through Amherst and Sunderland. Based on existing traffic volume and projected growth, it is not necessary to widen Route 116 to provide extra capacity. In addition, the existing full shoulders provide adequate room for bicyclists. As part of the secondary screening analysis (Section 6.2) the scope of the Route 116 concept was narrowed to provide intersection safety improvements at Meadow Street (Amherst), Sunderland Road (Amherst), and River Road (Deerfield).

Comment The need for widening the remaining sections of Rt. 9 in Hadley is of the *utmost importance*… Although I realize that the widening of Rt. 9 from the Coolidge bridge back to West Street in Hadley is already in the planning stage and thus was not specifically part of your study, I feel I must here again underscore the need to get that project moving *without delay*.

Response

Final design plans for the section of Route 9 east of the Coolidge Bridge are complete. A letter provided to the project team from Congressman Olver's office indicates that the project is scheduled to go to bid in June or July of 2004. Construction should start during either fall 2004 or spring 2005. This letter is provided at the beginning of the comment section.

Comment Likewise, the widening of Rt. 9 from Rt. 47 east to Maple St. is an absolute inevitability. I respectfully submit that this project is *far* too important to be relegated to the 'long term' (10-20+ years) category of your recommendations…this section of Rt. 9 promises to be a chokepoint far sooner than said 'long term'

Response

This alternative has been identified (to design, fund, and construct the improvements) as a long-term solution based on the projected traffic volumes along Route 9 and the length of the process for widening the roadway. Chapter 7 highlights the overall implementation timeframe.

Comments from Rob Stinson

Comment I think it's unreasonable to allow such limited time for public comment. While MassHighway did extend the period for comments by a week, there should be additional time for the public to participate in this phase of the process. Several weeks prior to the public information meetings I requested a copy of the full report from Mass Highway and was told it was not yet available. Nor, were copies available at the meeting I attended in Northampton.

Response

Based on several comments received from the public, MassHighway extended the contract period so that all comments received could be incorporated into the final report. Once the report is finalized, copies will be made available in the Town Halls of the various municipalities as well as at the MassHighway District 2 office. Additional copies can be requested by contacting the Mass Highway Bureau of Transportation & Planning at (617) 973-7319.

Comment …the northernmost new bridge alignment, for example, the Committee and VHB relied upon a projected 9% reduction in Coolidge Bridge traffic. I believe the traffic flow models used by the PVPC were cited as the source of this pivotal input. I simply don't understand how this number can possibly be so low, given the results of the origin-destination survey undertaken which showed that over 80% of the Coolidge Bridge eastbound traffic is destined for Hadley or Amherst.

Response

While it is true traffic is mostly destined to Hadley and Amherst, the majority of this traffic originates in Northampton. A bridge alignment to the north would connect the communities of Hatfield and Hadley. An analysis conducted using the PVPC Transportation Demand Model shows that the further north a bridge is located, the less likely people from Northampton would be to reroute their trip through Hatfield. As such, the northernmost bridge shows only a 9 percent traffic decrease on the Coolidge Bridge.

Comment ...Perhaps it was felt that all those designated to be on the Advisory Committee shared a sufficient use of the Coolidge Bridge to adequately represent the commuter stake in the process. Wouldn't the composition of the Committee have been more balanced if an avowed new bridge advocate had been a member? …Wouldn't attitudinal questions concerning the desirability of a new bridge have been reasonable to include in the origin and destination study performed?

Response

There were several members of the Study Advisory Group (SAG) who initially supported a new bridge crossing and the majority of SAG members were sensitive to the needs of the commuters. The Origin-Destination study performed did not specifically ask whether residents preferred a new bridge, however, the survey did ask for additional comments in general.

Comment Was the potential long-term economic development impact of a new bridge represented? If the University is to realize its potential as an engine of economic development for the region, wouldn't more direct and efficient access to its resources and nearby spin-offs be a factor to consider? In addressing the business-related impacts, how did the study represent the costs to commerce of even greater traffic congestion?

Response

The study did not examine the long-term economic impact of a new bridge.

Comment The brief description of the environmental criterion provided in the summary pages includes air quality. Perhaps the full report will make clear the specifics of what was included in this category of effects. Were the emissions from snarled bridge traffic projected and included?

Response

Section 1.2 outlines the environmental criteria that were considered and Chapter 3 provides a detailed description of the existing environmentally sensitive locations in the study area. The environmental alternatives analysis is provided in the technical appendix to this report. While each alternative was reviewed to determine the general impact or benefit to air quality, emissions forecasts were not calculated.

Comment The summary states that "Permitting would be a difficult and lengthy undertaking."… So What if it's a lengthy and difficult process…it is more than a little patronizing to forego further work because there's too just too much work to be done.

Response

While it is recognized that permitting a new bridge would be a difficult and lengthy undertaking, this is not the deciding factor in the report's recommendation not to persue an additional bridge crossing. As described in detail in Sections 6.1.3 and 6.2.2 it is the high environmental and social impacts versus the relatively low transportation benefit that preclude the feasibility of a new bridge at this time.

Comments from David Elvin

Comment I was very disappointed to learn that these meetings, which were held just three weeks before the conclusion of the 18-month study, were the first opportunities for general public input. As a result, there will be no opportunity for response to the numerous public comments in the final report… I strongly recommend that MassHighway extend the contract of the study consultant to allow for a full evaluation of public comments and for revisions to the study, if necessary, based on those comments.

Response

Based on several comments received from the public, MassHighway has extended the contract period so that all comments received could be incorporated into the final report.

Comment The study appears to be fundamentally flawed because it fails to account directly for more than 500,000 square feet of new high-traffic volume retail stores that is on the books in Hadley and due to open in 2005...The magnitude of traffic growth accompanying these projects cannot possibly be accounted for in the 1.5% annual regional growth model used in the study, as the residential and other background growth will continue to occur (perhaps even at an even greater rate than 1.5% per year in the wake of this new development). The study must be adjusted to account for these projects, and the alternatives re-examined with respect to meeting a 2025 horizon year

Response

The traffic projections represent a "snapshot" of the future as it appeared at the time of this study. This report precedes the newly submitted environmental documents for retail development along Route 9 and plans to increase University size had been discussed but not formalized. It is expected that private developers and the University will use this study as a baseline for all future development, beyond the growth anticipated at this time, so that the proponents can adequately mitigate the impacts of their projects. It should be noted that the model projections for Route 9 in Hadley (which were approved by the Town of Hadley) include retail employment growth of approximately 468 employees and 8,000 attraction trips. This equates to just under 500,000 square feet of additional retail development.

Comment The study corridor is well suited for bus rapid transit (BRT), yet the study fails to fully examine the possibilities of this transit mode. … I strongly urge the consultant to review these programs…and perform a much more aggressive analysis of how a full-fledged BRT system could be made to work in the corridor. The cost of a full BRT system between Amherst and Northampton is comparable to that of a bridge, yet did not receive anywhere near the level of technical analysis as bridge crossings did.

Response

Although not discussed in detail at the public meeting, a BRT system was analyzed as part of this study. This analysis, and its conclusion can be found in Sections 6.1.5 and 6.2.3. A hybrid BRT system is recommended along the Route 9 Corridor.

Comment There are many additional options for reducing demand that the study did not seem to review seriously.

Response

Sections 6.1.5 and 6.2.3 also show the analysis of many Transportation Demand Management (TDM) and Intelligent Transportation Systems (ITS) alternatives. An extensive TDM and ITS program has been recommended for the study area as part of the short-term (Section 7.1) and medium-term (Section 7.2) alternatives. The analysis indicates that a package of TDM options could compliment each other to form effective alternatives to reduce congestion. Combined with a strategic corridor preservation plan along Route 9, these actions have the ability to maintain acceptable traffic operations along the corridor well into the future.

Comments from Edward Hagelstein

Comment There is a good possibility that westbound Hadley/Amherst traffic to the Coolidge Bridge will still become congested, particularly during periods of high volume traffic resulting from college graduation exercises, football games, Mullins Center events, holiday shopping, burgeoning development, etc.

Response

Based on the future traffic projections, the recommendations made are adequate to address traffic congestion through the 2025 horizon year. Standard transportation practice dictates that roadways should not be designed based on non-typical events such as college commencements, move-ins, or sporting events. While it is likely some congestion will occur at these times, these are localized, “special” events that do not occur on a regular basis and do not contribute to daily congestion within the study area.

Comment I would like to suggest that an elevated ramp, from the Coolidge Bridge to I-91 north only, be reconsidered because such a ramp would only have to rise to the elevation of I-91 and not over it, possibly resulting in an acceptable ramp slope.

Response

Due to the lower traffic volume destined from Route 9 to I-91 north (as compared to the volume destined to I-91 south) a cost benefit analysis shows that a fly-over ramp to the north only does not provide adequate transportation relief to justify the cost of construction, especially considering the ability to provide the on-ramp from Damon Road.

Comments from the CT River Watershed Council

Comment The study summary that was presented at the two public meetings on December 9 did not mention an important issue that was a major focus of the final meeting of the Advisory Committee. That issue is the integral nature of land use regulation in Hadley and the future capacity of Route 9.

Response

Section 6.6.2 provides recommended guidance on land use regulation in Hadley and its affect on the future capacity of Route 9.

Comment The same issue relates to the planned growth of the University of Massachusetts. CRWC believes it is very important for MassHighway's to continue an active dialogue with the interests represented on the Advisory Committee to address future growth, some of which is imminent, and measures to control increased highway demand.

Response

The MassHighway District 2 office currently maintains a high level of local and regional involvement in the area. Should an Advocacy Group be formed subsequent to this study, MassHighway will continue involvement in the process.

Comment We need to find creative ways to encourage and provide for increased use of public transportation, ride sharing, and other measures to decrease the number of cars that travel the Route 9 corridor daily from Florence to Amherst. This should be a public priority. Simply building more highway capacity is not the answer.

Response

Chapter 7 provides recommendations for an aggressive TDM program. This program includes the extension and conversion of the current Route 9 bus system to a hybrid BRT system. It is recommended that the Towns of Williamsburg, Hadley, Amherst, and Belchertown, and the City of Northampton work with MassHighway and the PVTA to provide this extended and/or upgraded service to their communities.

Comments from Paul Styspeck

Comment The Route 9 Widening Project may also help once the funding is in place and is constructed…However, I noticed that the study recommends this solution as a 'Long-Term Recommendation! I strongly disagree with this assessment and believe that it should be re-prioritized into the short term.

Response

This alternative has been identified (to design, fund, and construct the improvements) as a long-term solution based on the projected traffic volumes along Route 9 and the length of the process for widening the roadway. Chapter 7 highlights the overall implementation timeframe.

Comment I fail to see how these [short-term recommendation intersection improvements] intersections impact any of the traffic traveling over the Coolidge Bridge into Northampton.

Response

Most likely they do not. The study area encompasses a large portion of the Pioneer Valley, stretching from Holyoke north to Deerfield. Although much more localized than the congestion faced along Route 9, the existing and future conditions assessments (Chapters 2 and 4) show that the TSM improvements identified in Section 7.1 are necessary to address congestion and/or safety concerns in other portions of the study area.

Comment The first proposed bridge site connected Route 47 in Hadley to Route 5 in Northampton... If that particular site did not work due to various constraints, please look again. Routes 47 and 5 are both State owned roadways that would be easier to upgrade than any local roadways. Did you consider a crossing that would be approximately one mile south of the study site?

Response
In addition to environmental constraints, the bridge assessment also investigated the transportation benefit of a new bridge south of the existing Coolidge Bridge. As discussed in Section 6.1.3, there are substantial engineering obstacles with construction of a bridge in this location.

Comment Vehicles currently utilize Cemetery Road in Hadley (off of West Street) to attempt a 'short cut' around the Route 9 traffic…this is not the type of neighborhood where an average of 6000 vehicles (at last count) travel daily. It is only a matter of time until the Town of Hadley disallows this cut-through…this reserve area (for vehicles) will be forced back onto Route 9 which will certainly cause the traffic to back up daily though the intersection of Route 47 and 9.

Response
There are a number of roadways in Hadley that continue to see traffic increases as a result of local and regional growth. Improvements to Route 9, further promotion of public transportation, and land use management are all essential to combat this trend.

Comments from Eric Stahlberg

Comment Structures that truly keep traffic moving, (eg. elevated roadways, tunnels, overpass, etc.) are not mentioned. [For instance] 91N to 9W, new exit, backtracking [Damon S] to 9 to head west, more traffic dumped on Damon, may need light to enter 9W flow. 91N to Damon N, must cross 9 [light req] as it does now or new exit dumping on Damon beyond 9 requiring a left onto Damon N [would need a light] OR could be done with a *flyover*. 9E. 9W to 91S, left-turn required at current ramp on 9 [light to control traffic?] 9W to 91N, new ramp, turn onto Damon N then a left crossing Damon S traffic [light reqd] onto new ramp OR could be a *flyover*. 91S to 9 E/W, new exit, 9E puts more traffic on Damon requiring a left to get onto Damon S to 91S, right onto 9W then left onto 91S at current ramp on 9.

Response
A full range of improvement alternatives (including fly-over ramps and underpasses) are reviewed in Sections 6.1.1, 6.2.1, and 6.2.2. As described, a fly-over ramp is not feasible. The recommended alternative would provide a signalized intersection at Route 9 and the I-91 southbound on-ramp and on Damon Road at the new ramp intersection. Operations of this signal would be coordinated with the Damon Road/Route 9 signal.

A traffic signal already exists at the intersection of Route 9 and Damon Road. The traffic currently heading from I-91 north to Route 9 west makes a left-turn at this signal (the four-way intersection of Route 9, Damon Road, and I-91). This traffic will now exit on Damon Road and make a right-turn to access Route 9 west. As part of this improvement, the Damon Road/Route 9 intersection becomes a three-way intersection (no longer needing a signal to accommodate the left-turn and through movements from the existing ramp) and more green time can be provided to Damon Road to facilitate the additional traffic.

A new exit ramp from I-91 south would be provided on Route 9 and allow a right-turn to Route 9 east only. Traffic destined west on Route 9 would continue to use Exit 20. At no time would traffic accessing Route 9 from the new I-91 south off-ramp be traveling along Damon Road.

Comments from William LaChance

Comment Could drivers at the King St./Damon Rd. intersection be made aware of the 91 South entrance at the exit 21 interchange?

Response
MassHighway will look into improving signage as part of the planned intersection upgrade.

Comments from Joe Liebman

Comment At present, access to the bicycle path across the Connecticut River from downtown Northampton is only possibly by proceeding east on Rt 9 and turning northward onto Damon Rd to the park and entrance to the bicycle path. Because of the high volume of traffic on Damon Rd, it is really not possible to reach the bicycle path by traveling southward. Until such time as the city of Northampton completes the connection of the bike path to downtown, underneath I-91, bicycles will be competing with cars in the intersection of Rt 9 and I-91.

Response
Plans to provide a Damon Road overpass for bicyclists and pedestrians are currently being designed by the City of Northampton. The new northbound off-ramp will have adequate clearance to pass over the bike trail.

Comments from Gregory Bennett

Comment Where would you plan on placing the ramp that would allow NB access on Damon Road?

Response
Chapters 5 and 7 provide conceptual improvement graphics showing approximate ramp placement. It is possible the location of the ramps could shift as the project moves into the design phase.

Comment it again appears the proposal failed to account for growth factors in Hadley and Amherst…UMass plans to construct additional dorms…is that factored into the analysis? A Lowe's and Home Depot (first in the local area) will shortly be constructed in the area, it appears the analysis failed to take this into account…Hadley recently voted down any restrictions on residential growth, which again fails to be computed in your analysis.

Response
The traffic projections represent a “snapshot” of the future as it appeared at the time of this study. This report precedes the newly submitted environmental documents for retail development along Route 9 and plans to increase University size had been discussed but not formalized. It is expected that private developers and the University will use this study as a baseline for all future development, beyond the growth anticipated at this time, so that the proponents can adequately mitigate the impacts of their projects. It should be noted that the model projections for Route 9 in Hadley (which were approved by the Town of Hadley) include retail employment growth of approximately 468 employees and 8,000 attraction trips. This equates to just under 500,000 square feet of additional retail development.

Comments from Gregory Beaumier

Comment Why not a rotary or circle on the Northampton side of the bridge? Comparable to the one on the West Springfield side of the Memorial Bridge. I believe a rotary would move traffic much smoother. An on-ramp to 91 North would also help.

Response

A roundabout and a rotary at this location were considered (Concepts 12 and 14) as discussed in Chapter 5. The analysis conclusions can be found in Section 6.1.2 of the report.